October 4, 1956

The IRON AGE

The National Metalworking Weekly

Tonnage Oxygen: Pressure Under Big Market P. 91

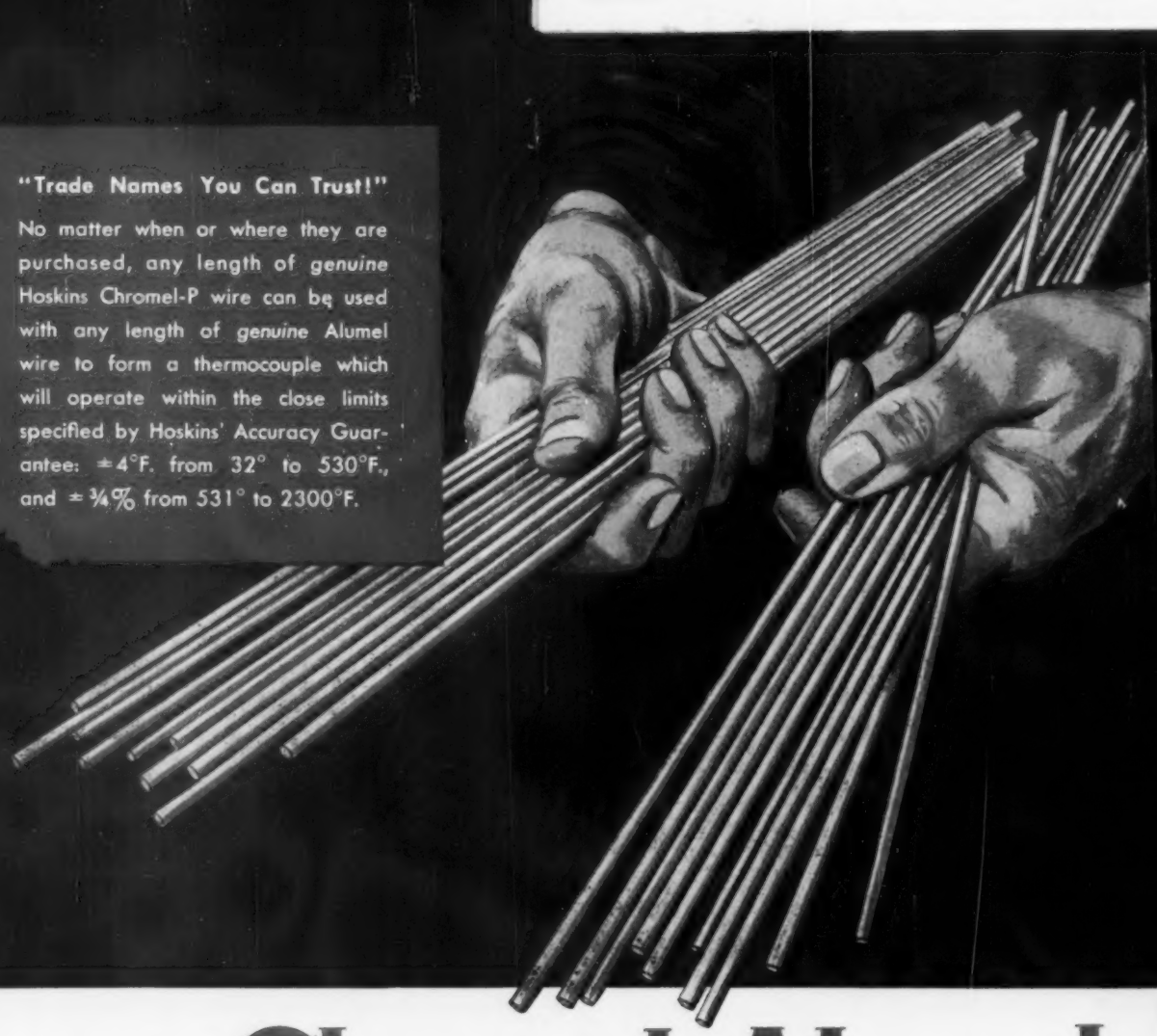
Taft-Hartley: A New Look At The Issues P. 51

West Coast: Another Fairless Works? P. 56

Digest of the Week P – 2

"Trade Names You Can Trust!"

No matter when or where they are purchased, any length of *genuine* Hoskins Chromel-P wire can be used with any length of *genuine* Alumel wire to form a thermocouple which will operate within the close limits specified by Hoskins' Accuracy Guarantee: ±4°F. from 32° to 530°F., and ±¾% from 531° to 2300°F.



HOSKINS Chromel-Alumel

THERMOCOUPLE ALLOYS

CONSIDER for a moment the significance of the statement made above and what it means to users of Hoskins Chromel-Alumel thermocouple alloys the world over. For example, take "The Case of the Ageless Alumel" . . .

Not long ago, an industrial concern in Japan "discovered" 265 pounds of 8-gauge wire hidden away in a remote corner of their plant. Its Inspection Tag, still intact, identified it as being Hoskins Alumel that had been purchased over 20 years ago. How it had escaped being used during all those years no one knew. Inasmuch as it was still in good usable condition, however, the company wrote to inquire if it would be practical . . . or indeed even possible to have a similar quantity of 8-gauge Chromel-P wire specially processed so that its millivoltage would match that of the 1933-vintage Alumel. Imagine their surprise when they were advised that all Chromel-P alloy is specially processed by Hoskins to a uniform standard of quality, and that . . . "regardless of when produced or where purchased, any length of *genuine* Chromel-P wire can be joined to any length of *genuine* Alumel to form a thermocouple which will register true temperature-emf values within the close specified limits of Hoskins Accuracy Guarantee."

No wonder, then, that Chromel-Alumel thermocouples are the world's basic standard of accuracy for the measurement of high temperatures. No wonder that the words "Chromel-Alumel" are recognized as . . . "trade names you can trust!"

If you use thermocouples, this new manual is meant for you! It contains complete specifications on Chromel-Alumel alloys, lists temperature-millivolt equivalents, explains standardization procedures, gives much useful application data. And it's yours for the asking without obligation. Send for your free copy today!

Chromel-Alumel thermocouple alloys are produced exclusively by

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Television set is an RCA Victor "Personal" model.

Portable TV: coming up fast

Television in the home is taken for granted today, just as radio was fifteen or twenty years ago. What Americans are reaching for now is television they can carry around and plug in anywhere; in other words portable TV. What's more, they are getting it!

And as portable television gains in popularity, it calls for ever more sheet steel. Bethlehem sheets are used in the chassis of many of these portable sets, in tonnages undreamed of just a few short years ago.

So, too, with other products which have become big business in the decade since World War II. Air conditioners, for example. And farm machinery. Radiant baseboard heating systems. Steel fireplaces, outdoor barbecues and metal ironing boards. These and many others depend for their continued success on the strength and workability of fine sheet steel.

At the same time, the sheet steel requirements of longer-established users are growing too. All added together, they keep our Sparrows Point and Lackawanna sheet mills jumping. You may be sure we are doing everything humanly possible to meet the tremendous demand.

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BETHLEHEM SHEETS

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Oct. 4, 1956—Vol. 178, No. 14

The IRON AGE

Digest of the Week in Metalworking

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NEWS DEVELOPMENTS

WHAT ARE THE REAL TAFT-HARTLEY ISSUES? P. 51

Still controversial after nine years, T-H is again a political issue. Right-to-work provision is now labor's big target. Repeal is unlikely but amendment is more likely in next Congress than at any other time. Emergency injunction is no longer a key issue.

REFRACTORIES BET HIGH ON BASIC BRICK P. 54

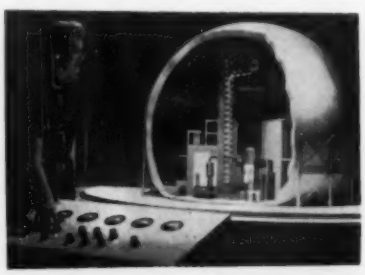
Demand for basic brick results in new expansion for refractories. Climbing steel production demands faster heats and hotter temperatures. All-basic brick furnaces show good results.

FRINGE BENEFITS ARE GETTING COSTLIER P. 55

Wages no longer present a true picture of what a company pays its employees. As of 1955, fringe benefits counted for 18.8 pct of the average metalworking company's payroll.

HOW TO TAP THE ATOMIC ENERGY MARKET P. 59

Metalworking has a big new market in atoms. Research and development



alone will move to $1 billion a year. Many metalworking firms can reach the market with their own products. Here are some tips on how to develop business in nuclear energy.

HAND-SCARFING, such as illustrated removal operations with cutting torches, still account for lion's share of oxygen consumed by the steel industry. See "Tonnage Oxygen" article beginning on P. 91, summarized below.

NEW FAIRLESS WORKS ON WEST COAST? P. 56

U. S. Steel is considering an integrated mill in that area. Land has been purchased at Pittsburg, Calif. Western steel market now exceeds present producing capacity. Growth has been 150 pct of national rate. Corporation's committee visited Calif. in summer to study the possibility of expansion.

FEATURE ARTICLES

TONNAGE OXYGEN: PRESSURE UNDER A BIG MARKET P. 91

Steel's expansion ties in closely with oxygen steelmaking processes. Oxygen consumption has already started to skyrocket. In addition to the established oxygen converter, blast furnace oxygen enrichment and use of the oxygen lance for decarburization, a new Swedish technique is about to make its debut. It adds up to a big oxygen boom coming.

TRIM FLASH QUICKLY WITH PRESS DIE SETUP P. 96

Fast, effective post-casting cleanup of discastings is essential to realizing fullest advantages of the process. Power presses are one good way to trim sprues, gates, flash. One large plant mass-produces castings, quenches, conveyorizes them to trim presses, other operations. Trimmed scrap returns for remelt.

WHAT DO WE KNOW ABOUT HYDROGEN IN STEEL? P. 98

Applied to the critical problem of hydrogen entrapment in steel, the old hawker's claim that you can't follow the game without a scorecard becomes a lot more meaningful. It's facts that count. This two-part series reviews virtually everything that significant research has established on the subject of hydrogen in steel. It's basic reading for steelmakers and users.

ELECTRIC BOLT HEATERS SPEED PRESS CONSTRUCTION P. 102

Big mechanical presses are built rugged to stand up under rigors of capacity operation, occasional severe overloads. Most straight-side presses are of four-piece tie-rod construction. In assembly, tie rods are heated, then shrink-tightened for proper pre-stressing. Many heating methods have been tried. Electrical resistance units now halve heating time, find added utility in press users' plants.

OLD ROLLING MILLS YIELD MORE TONNAGE P. 104

Specialty rolling mills handling small orders usually can't afford the latest in roll units. But they don't have to use antiquated coil-handling methods. This firm carefully integrated modern accessories to three 30-year-old mills. Result: an estimated 20 pct minimum gain in productivity and better quality strip material.

MARKETS AND PRICES

SPRING INDUSTRY BOUNDING TOWARD SALES GAIN P. 60

Somewhat erratic sales pattern won't hinder probable take of $145 million this year. Railroad, automotive orders are big factor. Flat springs gain favor in both production and product applications. Active competition in auto market is coming from products like torsion bars and air springs.

FORD GUNS FOR '57 LEAD OVER CHEVROLET P. 68

Early start, new styling and engineering changes viewed as real advantage for Ford. General increase in car prices will favor all low price automakers. Chevrolet is seen as having the edge in capacity. New Ford line will include two sizes of cars—one with a 118 in. wheelbase and another with a 116 in. wheelbase.

MONEY SQUEEZE HASN'T HURT SPENDING P. 73

Neither industrial expansion or consumer purchasing slows down appreciably. Planning for new markets still bullish. Consumer sales hold up well. Higher cost of bank loans is often being added to customer prices.

MACHINE TOOL ORDERS SPURTED IN AUGUST P. 77

Sales were $87.5 million, shipments $75.1 million. Order backlog is now 7.7 months as compared with British total of about 15 months. Less American orders are placed for made-in-England equipment.

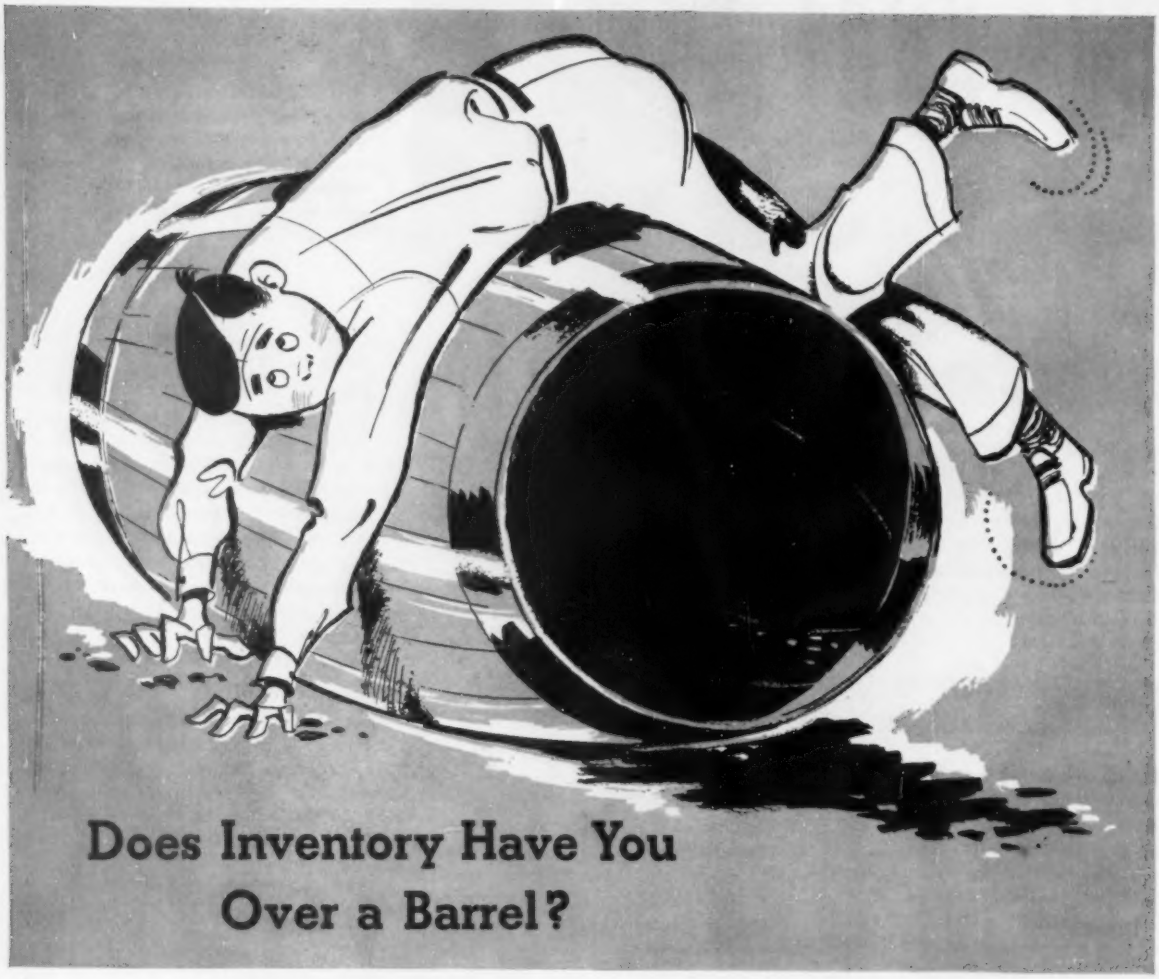
STEEL MILLS RESORT TO HOLDING ACTION P. 143

For all intents and purposes, fourth quarter steel order books are filled. But producers are staving off some consumers until they learn the requirements of auto producers. What's left will be rather skimpy.

NEXT WEEK:

FIRE PREVENTION: HOW SAFE IS YOUR PLANT?

Industrial fire losses are reaching an all-time high. Here's a rundown on the latest in fire prevention methods and equipment and how you can apply them. Also included are statistics on the extent of industrial fire damage.



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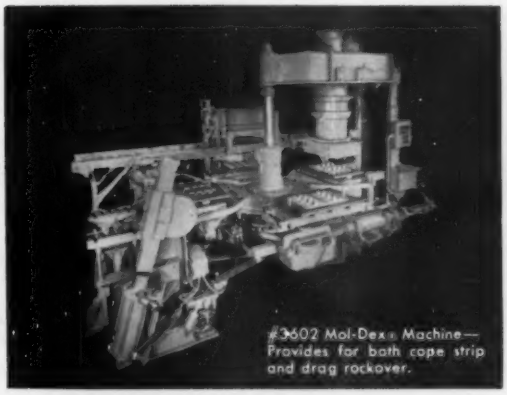
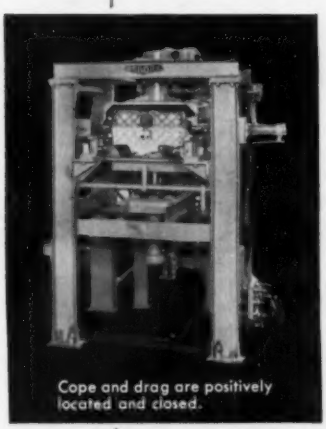


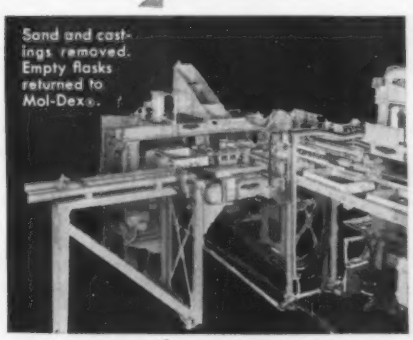
NEW foundry production system by OSBORN



SHORT run, as well as mass-production foundries can now profit from Osborn's completely integrated, fully automated foundry production system.

Quick pattern change accommodations are incorporated in this system—permitting a continuous flow of a wide variety of precision-formed castings.

This new foundry production system is another of the many advancements being made by Osborn in the field of high speed equipment. *The Osborn Manufacturing Company, Dept. FF-47, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



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(Advertisement)

What's New

IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

NEW IN RYERSON STOCK—Cold finished Ledloy hexagons in sizes up to 3". (Previous maximum size: 1½".)...Welded, square, structural tubing with a lighter wall. Advantages: Costs less yet has all the strength, good surface, etc., needed for ornamental applications.

NEW TYPE 202 STAINLESS NOW AVAILABLE FROM RYERSON—Pioneering with a new type of stainless steel, Ryerson now offers Type 202 sheets, No. 2B and No. 4 finishes in popular gauges and sizes, for quick shipment from stock. Since nickel may continue in short supply for some time, interest in this new stainless has been strong. Reasons: Type 202 contains only half as much nickel as Type 302 yet compares favorably with 302 in corrosion resistance, fabricates as readily as 302 and costs 2¢ per lb. less.

WHAT ABOUT HOT ROLLED BARS? A leading metal-working publication recently listed hot rolled carbon steel bars as a hard-to-get product—but this is not the case when you draw on Ryerson stocks. Our inventories of hot rolled bars have seldom been better, both as to tonnage and size range.

NEW, ACCURATE I.D. ON CYLINDER TUBING FROM STOCK—In hydraulic cylinder applications, the I.D. is the critical tubing dimension. Yet, until now, buyers of tubing from warehouse stocks could specify only O.D. and wall—and wall thickness may vary as much as plus or minus 10% under standard manufacturing tolerances. As a result, I.D. dimensions could vary so widely that tubing was not suitable for cylinder use. But now buyers may specify both O.D. and I.D. when ordering cold drawn seamless tubing from Ryerson (in 2" through 9" O.D. sizes)—thus assuring the accurate I.D. dimensions needed for cylinders. We believe we are the only warehouse to carry this stock.

REPORT ON NEW E-Z-CUT PERFORMANCE—New proof of the quality of Ryerson's leaded plate steel, New E-Z-Cut, was reported by company which recently made a mold for a miniature tire. Some of the tiny lands forming the tread design were only .015" thick but $30 worth of New E-Z-Cut took the risk out of the $4000 machining job. Because New E-Z-Cut is remarkably clean and free of excessive stringers, even the finest lands of the mold were sharp and true. Because New E-Z-Cut machines up to 30% faster than mild steel, the difficult job was completed in record time. High finish made the mold easy to prepare for plating.

FLUID LINE TUBING WITH IMPROVED FINISH—Another new Ryerson product is Hydra-Luster hydraulic fluid line tubing which has an unusually beautiful finish, free from scale and surface defects because of a new method of atmospherically controlled annealing. This tubing is on hand in all sizes through ¾" O.D. x 16 gauge wall.

PVC PLASTIC PIPE IN LARGE DIAMETERS—8" and 10" pipe in both schedule 40 and 80 have been added to growing Ryerson stocks of the remarkably anti-corrosive plastic—Ryertex-Omicron polyvinyl chloride. Also available: smaller size of pipe, fittings, sheets and rods. For complete data on properties, resistance to more than 300 chemicals, etc., write for technical booklet 80-3.

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Indexed in the Industrial Arts Index and the Engineering Index.

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EDITORIAL

Plate Shortage Overtones

◆ THIS WEEK there is an acute shortage of steel plates. Some customers are mad enough to call it chronic. Behind this plate shortage—and shape shortage too—is a complicated picture. It is not always clear to steel makers let alone steel users.

Plate and shape capacity is being expanded. That is but part of the story. It costs a lot of money to install this new capacity. Besides, there is no assurance that new plate and shape capacity will be as fully engaged as sheet capacity has been.

In recent years sheet production has grown by leaps and bounds. It has followed the population figures and growth in consumer goods. Sheet mill profit has been better than plate profit; so we are told.

Plate production still reflects peaks and valleys rather than a more or less straight line upward trend. Demand that produces the peak in plate output also produces frustrating shortages. It is probably true that when the valleys in output come they dampen enthusiasm for building enough capacity to match the biggest demand.

Many steel executives have stated strongly that each steel product should "pay its own way." That should mean that if plates cost more to make they should command a higher price—one that will bring a reasonable return and an incentive to produce. But that isn't the whole story.

In order to pay their own way, plates would have to be priced to offset some of the losses sustained when demand is in the doldrums; that would be one way of making sure that peak demand would be much better satisfied when it appeared.

This touchy plate and shape argument can be settled. The method of attack will have to be head-on. It might call for a realistic pricing of steel plate and shapes. Customers would much rather have the material than an economic lecture every time we go into one of those "heavy industry steel shortages."

Such a policy would cost the consumer more but he would get the steel when he wanted it. In the end many users pay more anyway because of delays, penalties, premiums and pure inertia.

Sooner or later something must be done.

Tom Campbell

EDITOR-IN-CHIEF

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dear editor: *letters from readers*

Labor Expense

Sir:

In the fourth paragraph of your Sept. 13 Report to Management ("Labor's endorsement of a candidate assures him of the use of labor's organization, even if not its complete voting support."), you left out an important point.

Labor, using its official publication to urge members to vote for the candidate it endorses, does this at the *expense of the members* who do not always share the same view. *C. S. Larmore, Baltimore, Md.*

Positive Plan

Sir:

I am very much interested and impressed with the report of the unique merit rating plan ("Merit Rating: A Positive Plan Pays Off") described in THE IRON AGE of Sept. 20, 1956.

If you do have available a more detailed description of the plan, we would greatly appreciate the opportunity of seeing it.

Our main office is here and we have a branch office in Philadelphia. Total employment is about 250 people. *S. Boulton, Mgr. Research Dept., Baker Weeks & Co., New York, N. Y.*

For more information write M. A. Barone, Barone Associates, 6796 Market St., Upper Darby Pa.—Ed.

Big Impact

Sir:

The Schwartzbart and Sheehan three-part article on impact properties of heat treated low-alloy steels, covers a perceptive and comprehensive research on important familiar steels. Publication of the report in detail is a distinct contribution to the technology of these materials.

You have already furnished me tear sheets of Part I (Aug. 9), and I would appreciate receiving reprints of Parts II and III (Aug. 16 and 23). *W. C. Troy, Hunter Engineering Co., Riverside, Calif.*

Tearsheets are on the way.—Ed.

Late Starter

Sir:

We have awakened, rather late, to the value of the six articles on stamping written by Mr. Strasser which appeared in your magazine starting March 15, 1956. In order these cover Blanking, March 15; Piercing, April 5; Bending, May 3; Special Bends, June 7; Joining Methods, July 12; and Drawn Parts, Aug. 2.

If these articles (either in part or as a set) are available, we would greatly appreciate copies of them. *K. A. Yeo, Aircraft Gas Turbine Div., General Electric Co., Cincinnati, Ohio.*

Copies of individual articles are still available.—Ed.

You can take this for what its worth —But I've already unloaded all of my personal stock in the company.

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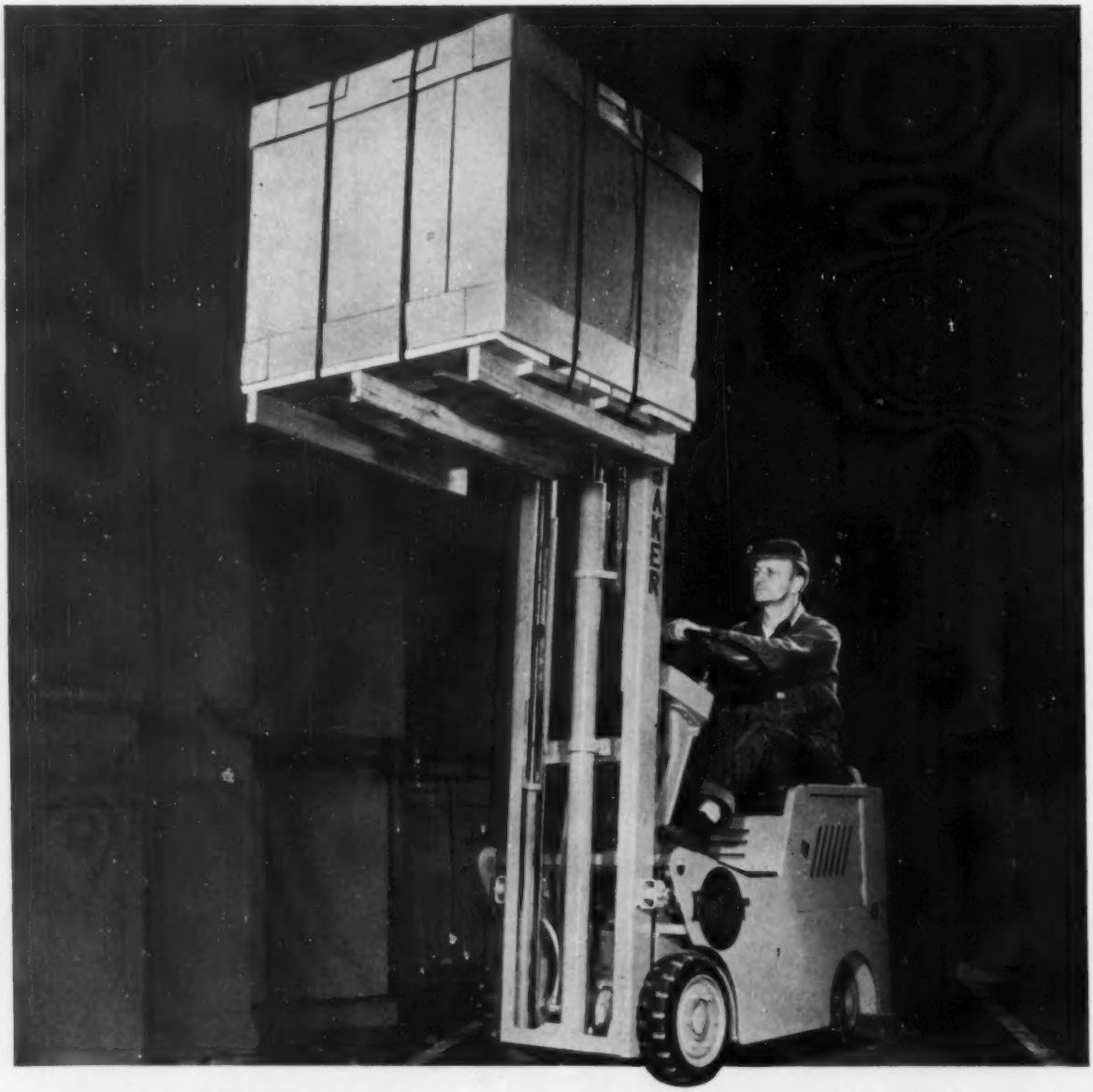

Now Baker gives you Balanced Design in an all new 2000 lb. gas fork truck

This newest addition to Baker's outstanding line of gas-powered fork trucks now completes the range of models from 2000 to 7000 lbs. Like its companions it features Baker *Balanced Design,* with all elements coordinated to work together for top efficiency, maximum dependability and longest life.

For greatest operator convenience and safety it features absence of cowl and offset driver position for better visibility . . . recessed seat for lower driver silhouette . . . unobstructed access for mounting from either side . . . effortless automotive steer . . . self-adjusting, self-energizing and self-equalizing hydraulic brakes.

Actual turning radius of this sturdy compact truck is only 61½ inches . . . it operates in 57-inch intersecting aisles. Total lift 130 inches . . . lifting speed 45 FPM, lowering 65 FPM . . . travel speed 8 MPH forward, 7 MPH reverse —all with full load. Mast tilts 10° forward or back.

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Tonnage O_2 and Pa. Dutch

It's just about a year since THE IRON AGE staff moved to the Chilton Co's new and expanded offices in Philadelphia. But the editors are fast becoming Pennsylvanians.

So much so, they're even developing an appreciation of the humor in the Pennsylvania Dutch dialect still spoken in some parts of the state. This is no mean trick for a crew which had been subjected to the vernacular of New York City and its environs.

In gathering material for his article on tonnage oxygen (see p. 91 this issue) Technical Editor John Obrzut was given this Pennsylvania Dutch description of an oxygen plant by Warren Francis, Air Products, Inc., Allentown, Pa.

The pressure goes the compressor up
And this the air makes hot.
After the caustic scrubber goes
The CO_2 is not.

Driers nezt the water catch
The temperature gets small
Expanders outen Btu
The enthalpy is all.

The columns split the mixture
The pressure makes by pumps
Exchangers vaporize already
Out yet the oxygen jumps.

New Look

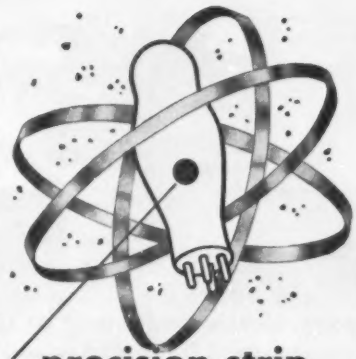
Chances are, you will be surprised to realize that the Labor Management Relations Act of 1947, better known as the Taft-Hartley Act, is almost 10 years old.

Because it is still a live issue, even after nearly 10 years of attack and controversey, IRON AGE editors decided it was time to take a new look at Taft-Hartley, and reexamine it on the eve of a national election while it is still an issue.

Assistant News-Markets Editor Dick Raddant drew the assignment of developing this week's Special Report on the Taft-Hartley Act (p. 51). Basis of the report is a series of interviews with labor relations specialists in all branches of government, industry and labor.

On one Washington visit, for example, Dick interviewed James M. Brewbaker, counsel for the House Committee on Education and Labor (see picture); Michael J. Bernstein, counsel for the Senate Committee on Labor and Public Welfare; Roy James, head of the new labor division of the Republican National Committee; Albert Woll, general counsel of AFL; representatives of the National Assn. of Manufacturers; to name a few.

Reporter Raddant (l.) and House Counsel Brewbaker



precision strip
for electronics applications

From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless 17-7PH
Invar
Magnetic: High Nickel

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

Write for Bulletin 7 TODAY.

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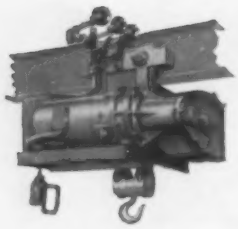
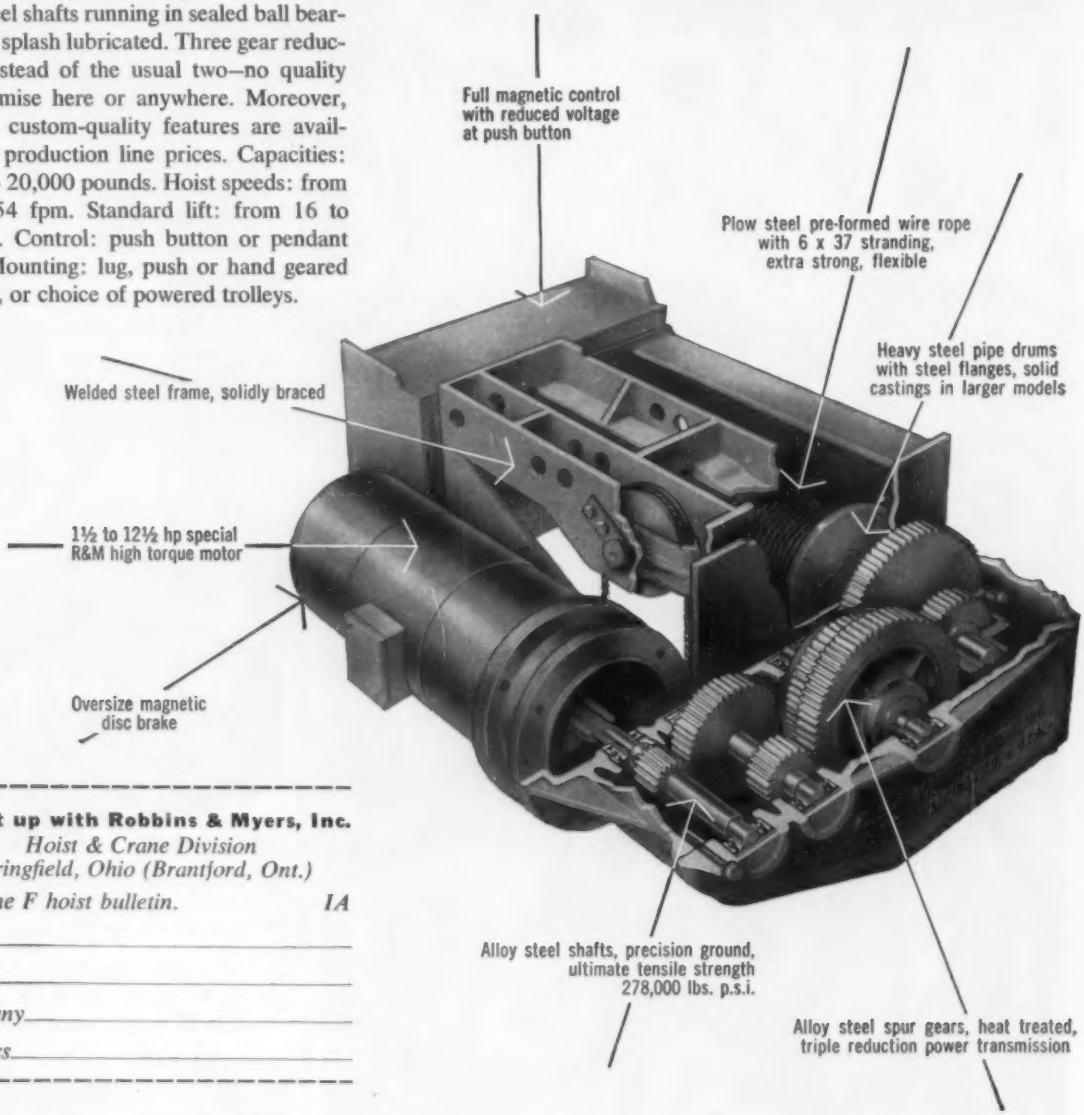


R&M F hoists cut down the cost of lifting but the F hoists save still more money. Dollars usually spent on maintenance become dollars earned because of the extra stamina built into each component. Look at the gearing—here are precision cut alloy steel spur gears, wide faced and heat treated for durability. They're mounted on alloy steel shafts running in sealed ball bearings, all splash lubricated. Three gear reductions instead of the usual two—no quality compromise here or anywhere. Moreover, F hoist custom-quality features are available at production line prices. Capacities: 1000 to 20,000 pounds. Hoist speeds: from 10 to 54 fpm. Standard lift: from 16 to 40 feet. Control: push button or pendant rope. Mounting: lug, push or hand geared trolleys, or choice of powered trolleys.

choose a hoist with extra stamina


Full magnetic control with reduced voltage at push button
Plow steel pre-formed wire rope with 6 x 37 stranding, extra strong, flexible
Heavy steel pipe drums with steel flanges, solid castings in larger models
Welded steel frame, solidly braced
1½ to 12½ hp special R&M high torque motor
Oversize magnetic disc brake
Alloy steel shafts, precision ground, ultimate tensile strength 278,000 lbs. p.s.i.
Alloy steel spur gears, heat treated, triple reduction power transmission

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)

Send me F hoist bulletin. *IA*

*Name*_____

*Title*_____

*Company*_____

*Address*_____

ROBBINS & MYERS **hoists • cranes • winches**

dates to remember

OCTOBER

The Material Handling Institute, Inc.—Fall meeting, Oct. 10-11, The Traymore Hotel, Atlantic City, N. J. Society headquarters, One Gateway Center, Pittsburgh.

Society Of Automotive Engineers, Inc., National Transportation Meeting, Oct. 10-12, Hotel New Yorker, New York, N. Y. Society headquarters, 29 W. 39th St., New York.

The Society Of The Plastics Industry, Inc.—New England Section Conference, Oct. 11-12, The Wentworth Hotel, Portsmouth, N. H. Society Headquarters, 67 W. 44th St., New York 36.

EXPOSITIONS

Metal Show—Oct. 8-12, Cleveland.

National Industrial Exposition & Management Conferences—Oct. 22-26, Detroit.

Third International Automation Exposition—Nov. 26-30, New York.

National Auto Wreckers Assn., Inc.—Convention, Oct. 11-14, The Waldorf-Astoria, New York. Headquarters, 11 S. La Salle St., Chicago.

American Institute of Mining & Metallurgical Engineers—Fall meeting Oct. 12, Warwick Hotel, Philadelphia. Society headquarters, 29 W. 39th St., New York.

American Society Of Civil Engineers—Commercial exhibit and national convention, Oct. 14-18.

American Machine Tool Distributors' Assn.—Annual meeting, Oct. 15-16, Broadmoor Hotel, Colorado Springs. Assn. headquarters, 1900 Arch St., Philadelphia.

The Office Executives Assn.—Annual national business show, Oct. 15-19, New Coliseum, New York.

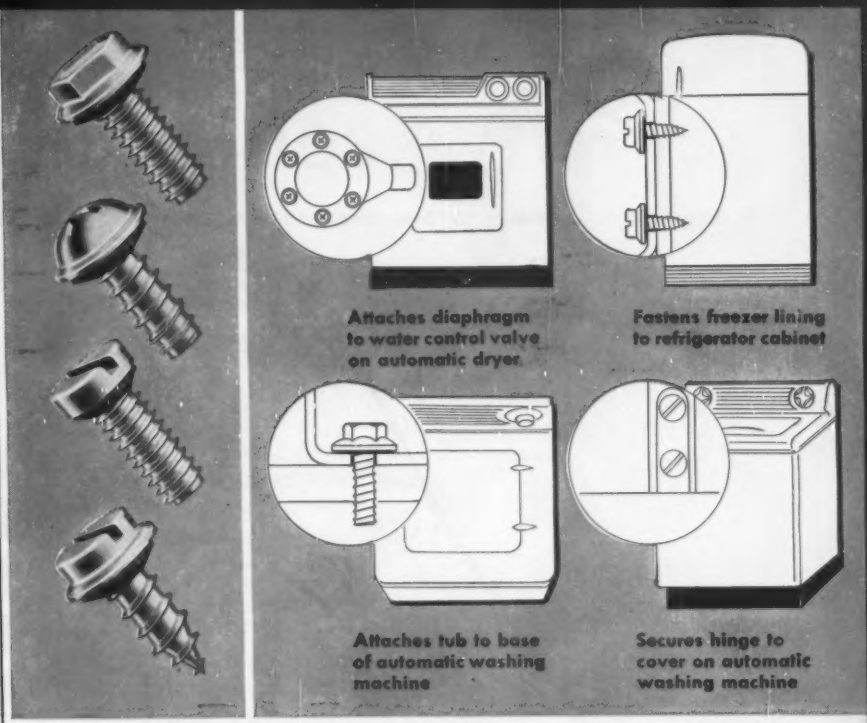
Rail Steel Bar Assn.—Semi-annual meeting, Oct. 15-16, Sheraton-Mount Hotel, Montreal, Canada, Assn. headquarters, 38 S. Dearborn St., Chicago.

American Gas Assn.—Annual convention, Oct. 15-17, Atlantic City, N. J. Assn. headquarters, 420 Lexington Ave., New York.

The Institute Of Management Sciences—Third annual international meeting, Oct. 18-19, Hotel Statler, Los Angeles. Society headquarters, 336 N. Foothill Rd., Los Angeles.

Foundry Equipment Manufacturers Assn., Inc.—38th Annual Meeting, Oct. 18-20, Greenbrier Hotel, White Sulphur Springs, W. Va. Society Headquarters, Suite 202, One Thomas Circle, Washington 5, D. C.

Conveyors Equipment Manufacturers Assn.—23rd annual meeting, Oct. 20-23, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, One Thomas Circle, Washington, D.C.


Attaches diaphragm to water control valve on automatic dryer
Fastens freezer lining to refrigerator cabinet
Attaches tub to base of automatic washing machine
Secures hinge to cover on automatic washing machine

Townsend *Tuff-Tites*®

Offer Appliance Manufacturers Lower Costs and Superior Performance

Leading appliance manufacturers are cutting production costs and improving their products by adopting Townsend Tuff-Tite fasteners. The one-piece head and washer construction of Tuff-Tites eliminates a major source of leakage. The additional pre-assembled neoprene washer not only serves to eliminate leakage, but also protects porcelain enamel surfaces from scratches and mars. Since they are resistant to vibration, Tuff-Tites have any number of applications in the appliance field.

If you have a fastening problem, Townsend specialists will be glad to make recommendations as to the proper Tuff-Tite to meet your needs. If a standard item cannot be used, Townsend engineers will design a custom-made fastener to answer your purpose.

For complete information, write to Townsend Company or use the coupon below.

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broken sardines and cut fingers

You avoid broken sardines and cut fingers when you open stubborn cans with their handy keys—keys which are often made from special uniformly tempered, low carbon CF&I-Wickwire Can Key Wire.

Chances are you don't need wire to make can keys. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

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Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
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Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
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Aircraft Cord Wire
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Belt Hook Wire
Bobbin Ring Wire
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Brush Wire (High Strain)
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Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
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Hose Wire, Vacuum and Defroster
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New Fair Lawn Facilities
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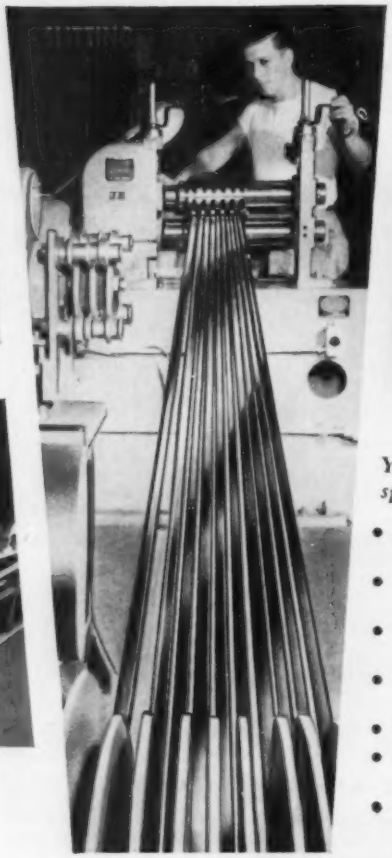
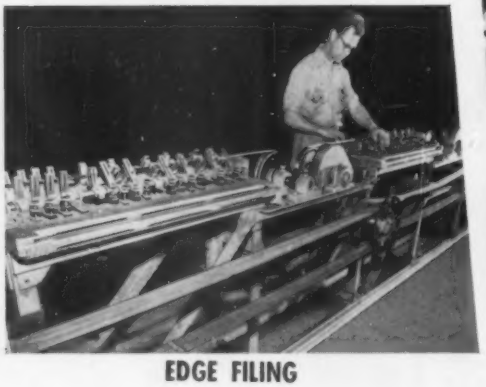


QUALITY CONTROL



EDGE FILING

You can get Sandvik cold rolled specialty strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock — or slit to your specifications.**

Ask your nearest Sandvik office for further information or technical assistance.

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Announcing...

44 ALUNDUM*

A sensational new concept in abrasive manufacture and performance

by NORTON ABRASIVES

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

MEET the New...

44 ALUNDUM abrasive

...a revolutionary Norton development for new "TOUCH of GOLD" economy in a wide range of grinding jobs

You Can SEE The Difference! The new Norton 44 ALUNDUM abrasive (right in illustration) differs radically in appearance from ordinary aluminum oxide abrasive as you can see from the 2 pieces shown here. The finer grain structure of "44" indicates its much denser, tougher composition. And the money-saving performance of this modern new abrasive is just as easy to spot — every time 44 ALUNDUM wheels go to work for you.

In new 44 ALUNDUM abrasive Norton brings you a combination of grinding quality, versatility and economy that has never before been equalled in a non-premium abrasive.

We want to emphasize that point. Although 44 ALUNDUM is non-premium priced, right there its resemblance to any regular aluminum oxide abrasive ends abruptly. It is definitely different and better in every way.

"44" is made differently, by a special, Norton-developed, electric furnace process that results in extreme toughness and ruggedness. This makes "44" the top performer for heavy duty grinding.

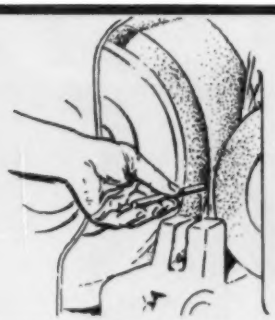
"44" performs differently. Compared to other non-premium priced aluminum oxide abrasive wheels, the new 44 ALUNDUM wheels cut faster, grind cooler and last longer. They hold form better, finish better and give more pieces per dressing. These are your "Touch of Gold" advantages that improve product quality, while reducing grinding time and costs.

"44" does more jobs. While not a cure-all, this new abrasive is a topnotch performer in widely varying types of grinding. For example:

PRECISION GRINDING	ROUGH GRINDING
CENTERLESS	SNAGGING
INTERNAL	WELD GRINDING
CYLINDRICAL	BILLET GRINDING
THREAD GRINDING	DISC GRINDING

MOUNTED WHEELS

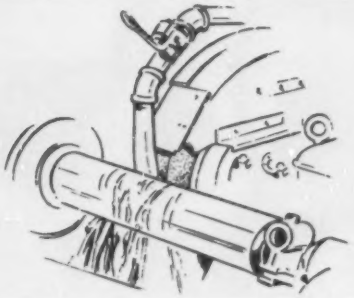
Proved In 1100 Tests. Before being offered to industry, 44 ALUNDUM wheels had the thorough testing given to every new Norton product. Over 1100 different tests were made — throughout the country and across "44's" entire job range. Here are some typical test reports:



CENTERLESS GRINDING

Job: Steel bushings. *Report:* "Faster cut, longer life and better finish."

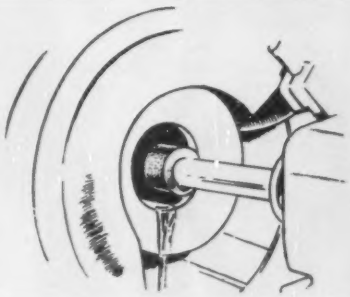
Job: Miscellaneous parts. *Report:* "44 ALUNDUM wheels much more versatile for different materials and set-ups. Time cut on one 14-hour job to 10 hours."



CYLINDRICAL GRINDING

Job: High speed steel dies. *Report:* "More pieces per dressing, cooler cutting, 30% longer life. Best wheel ever used."

Job: Miscellaneous steel parts. *Report:* "10% more pieces per dressing and 10% longer wheel life."



INTERNAL GRINDING

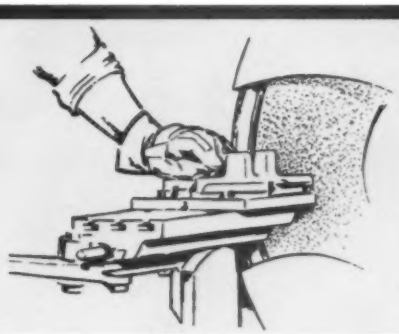
Job: Heavy duty hardened steel bushings. *Report:* "Even breakdown with excellent cutting action and less glazing. Half the dressings required with previous wheel."

Job: Steel gear housings. *Report:* "44 ALUNDUM wheels freer cutting, hold form better with less dressing and improved finish."

SNAGGING

Job: Offhand snagging, welded iron sections. *Report:* "80% longer wheel life and much faster cut."

Job: Offhand grinding steel parts. *Report:* "Faster cutting, better finish, much less burn."



DISC GRINDING

Job: Coil springs. *Report:* "Production increased from 100,000 to 125,000 springs."

Job: Stainless steel castings. *Report:* "Freer cutting, less burr and longer disc life."

MOUNTED WHEELS

Job: Snagging cast steel. *Report:* "Faster cut and 30% longer wheel life."

Job: Deburring steel welds and stampings. *Report:* "Four times longer lasting, with equal rate of cut."

Adding Up

Anything you can grind with non-premium priced aluminum oxide abrasive you can grind with 44 ALUNDUM abrasive — in every case at least equally well, in most cases a great deal better.

And you can do *more* jobs with tough, versatile "44". A real workhorse abrasive, it delivers thoroughbred performance that means more and better grinding for less money.

44 ALUNDUM wheels are available in all the popular Norton bonds. Already these new wheels are solving a lot of grinding problems, for a lot of users. How about letting them tackle yours — right now?

See Your Norton Distributor for further facts. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

NORTON

ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes

On preceding pages you've read the benefit story of a great new Norton product. Here is . . .

The service story behind the new 44 ALUNDUM abrasive

"NORTON CITY"—ABRASIVE CAPITAL OF THE WORLD, contains over a mile of buildings, housing the most modern equipment ever devised for producing grinding wheels and other abrasive products. Here, too, 180 technicians in 19 specialized laboratories maintain Norton's long leadership in research and development. From this leading source of abrasive progress have come many news-making "firsts" — to which new 44 ALUNDUM abrasive is the latest addition.

COMPLETE STOCKS, STRATEGICALLY LOCATED. Gigantic stockrooms in the Worcester plant hold products totalling over 500,000 different grinding combinations. Norton warehouses are located in important industrial centers. Both the Worcester stockrooms and the regional warehouses carry generous supplies of the new 44 ALUNDUM wheels. And your Norton Distributor is careful to keep his own stocks — including 44 ALUNDUM wheels — fully adequate to the needs of his area.

Your Norton Distributor, one of over 315 in the United States alone, is your direct connecting link with the largest, most efficient service and supply system in the entire abrasive field. He can serve you in many important ways. For example:

- *The world's broadest line of abrasive products to choose from.*
- *Practical aid in any grinding problem.*
- *And for unusual problems he can always call in a Norton Abrasives Engineer.*
- *Prompt deliveries—and emergency deliveries to help you avoid costly shut-downs.*

Ask him for details on how the new 44 ALUNDUM wheels can bring you the product-improving, profit-boosting "Touch of Gold". Or write your nearest Norton district office.

NORTON
ABRASIVES

Making better products... to make your products better

W-1735
8-56

NOTHING *can equal* *Stainless Steel*

for its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

For Consumer Appeal. General Ionics Corp. is the first company to offer an all Stainless Steel water conditioner. Sales have boomed because of its handsome appearance and complete freedom from corrosion problems. The company even offers a 10-year warranty to prove their faith in USS Stainless Steel.

For Long Life. All over the country, dairies are switching to Stainless Steel milk cans because they never have to be plated, the smooth surface does not harbor milk solids and bacteria, and, for all practical purposes, the Stainless milk can simply will not wear out.

For Corrosion Resistance. Laboratory fume hoods at the New Jersey Zinc Company used to last no more than 18 months—and sometimes they looked like sieves after only three months. They replaced the hoods and piping with Stainless Steel, and after five years they still look like new.

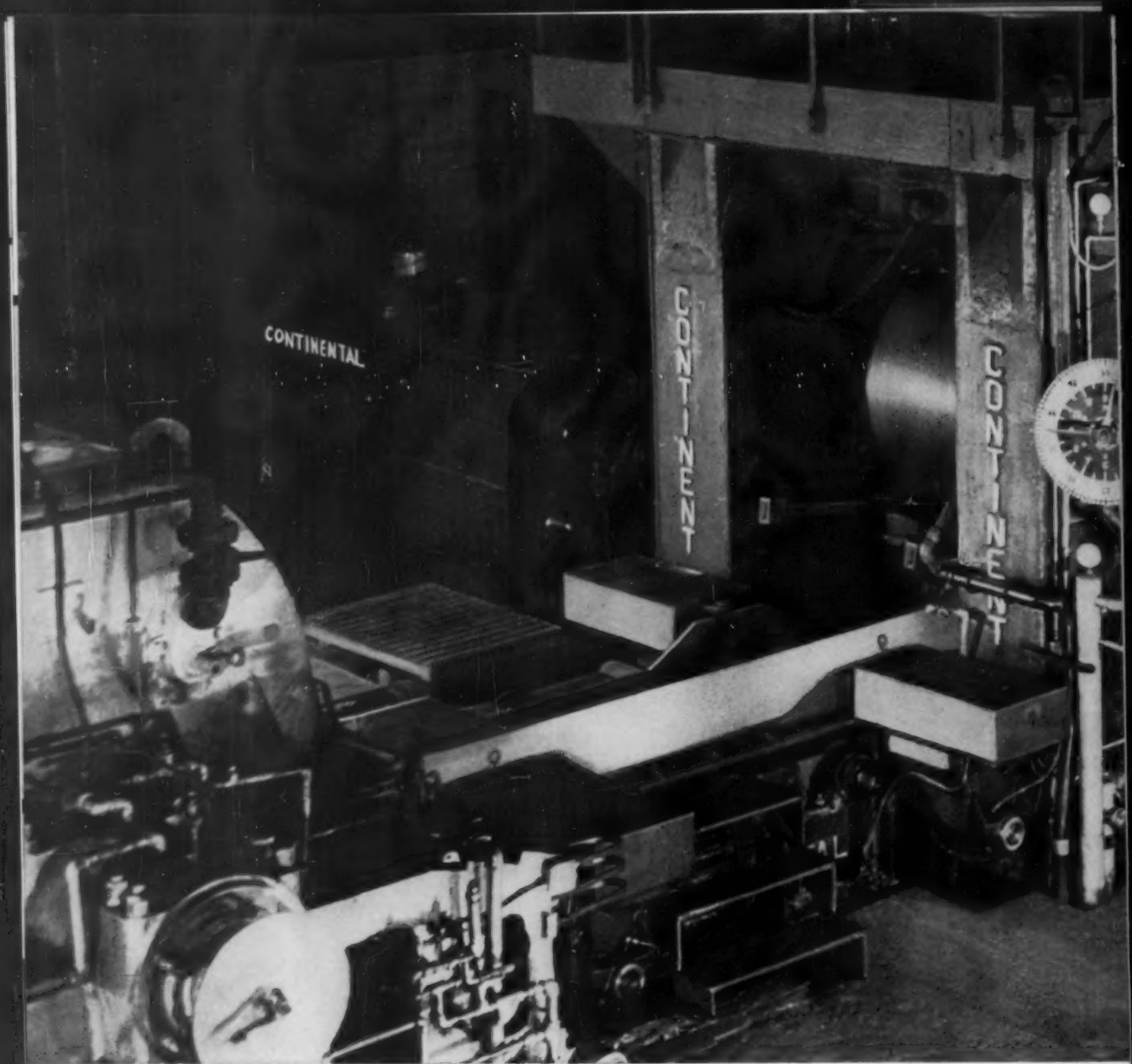
UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

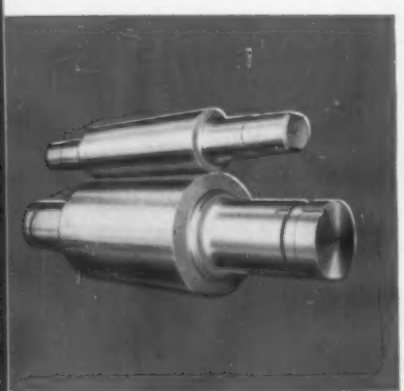
SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

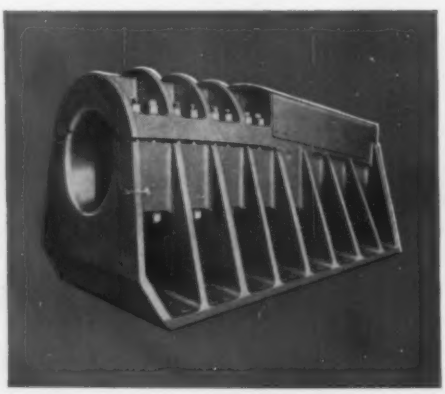
UNITED STATES STEEL



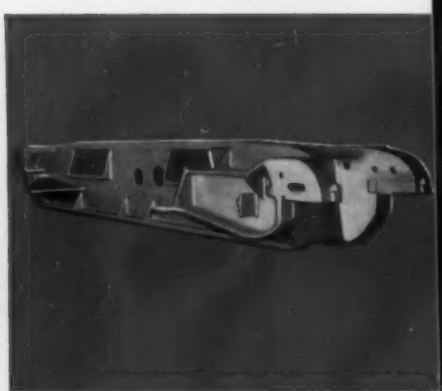
CONTINENTAL 26" x 49" x 66", 4-high reversing hot strip mill in the Newport Steel Corporation Plant, Newport, Kentucky.



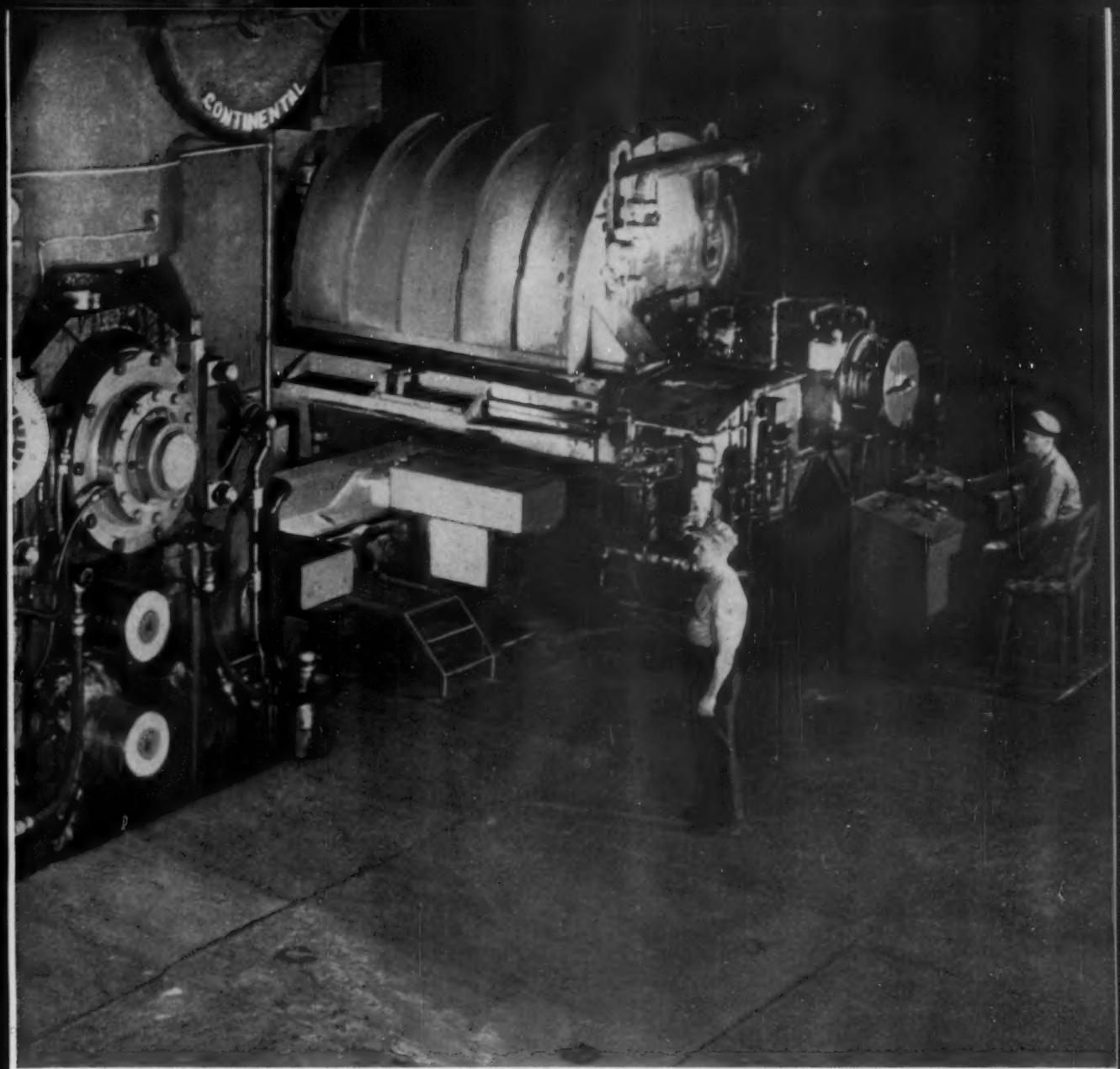
ROLLS—Iron, alloy iron and steel rolls for all types of rolling mills.



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.



WELDMENTS—fabricated steel plate, or cast-weld design.



BLAW-KNOX makes what it takes

to roll precision-gage hot strip directly from ingots

Precision-gage hot strip is rolled directly from ingots by this modern CONTINENTAL 66-inch 4-high reversing hot strip mill in the Newport Steel Plant at Newport, Kentucky.

A full range of gages and analyses, including carbon and special grades of steel, are rolled by this 26″ x 49″ x 66″ mill. The mill was designed to incorporate an existing 4000 hp. d.c. reversing motor through a pinion stand.

Blaw-Knox designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment.

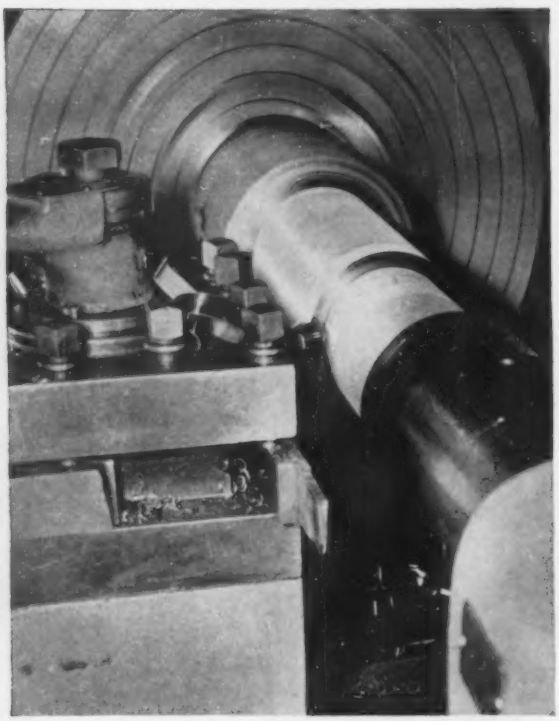
50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL
Foundry & Machine

More production for your tooling dollar is the reason...

WHY IT PAYS TO SPEND FOR CARBOLOY EXTRA—

If you rely on "Equivalent Grade" Charts to save a few tooling pennies, these facts on carbide costs may save you thousands of production dollars



TESTS ON STAINLESS STEEL VANED ROLLS by a New Hampshire pulp and paper-processing equipment manufacturer demonstrate how the "Equivalent Grade" Charts hide tremendous differences in carbides' production abilities. With Grade "X," production per tool was limited to two pieces per grind. Machine speed had to be held down to protect the carbide.

Switching to Grade 370 brought the manufacturer 8 to 9 pieces per grind. Machine speeds were doubled; 14 hours a day in labor were saved. Result: savings of more than $100 a week, in addition to lower downtime, grinding, and inventory costs.

SO-CALLED "Equivalent Grade" Charts hide the fact that no two carbide grades will produce the same results. Because they classify carbides by broad areas of application, the Charts ignore important differences in production ability.

Thus, they mislead buyers into believing they can safely purchase the cheapest grade listed for a job.

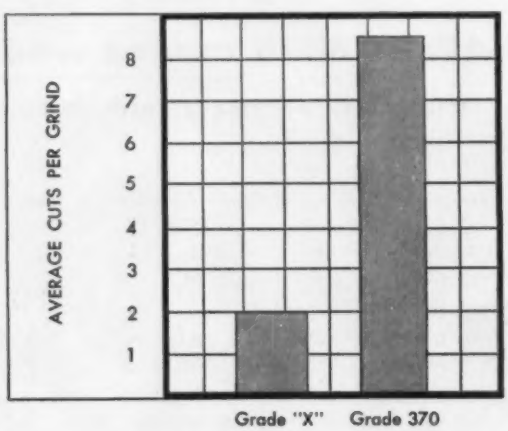
But actual tool-comparison tests have proved conclusively that the production abilities of carbides *do* vary tremendously. Moreover . . . these tests show that the pennies saved by buying on low initial cost often lead to thousands of wasted dollars . . . in lost production, lower machine efficiency, non-productive man-hours.

The case history at left is one of hundreds demonstrating why cost per finished piece – not initial cost – is the only reliable guide to buying carbides.

Results of an actual comparison test

According to the "Equivalent Grade" Charts, any one of several carbide grades could handle the job of machining these rolls. The manufacturer tried Grade "X" first – because it cost 10% less, initially, than Carboloy* Extra-Performance Grade 370.

Grade "X," however, machined only two rolls per day. Grade 370 increased production to 8 or 9 pieces per day (Graph No. 1).



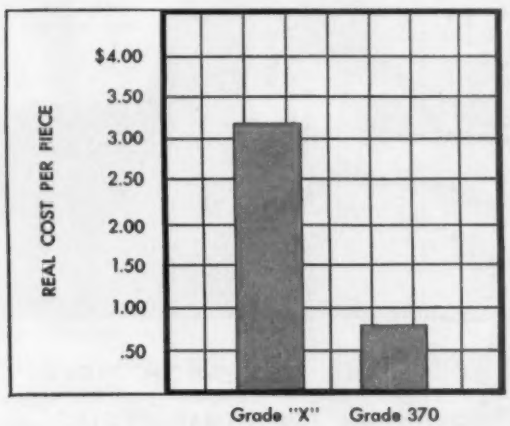
Graph No. 1—Production Ability Comparisons

*CARBOLOY IS A TRADEMARK OF GENERAL ELECTRIC COMPANY

A FEW CENTS MORE PERFORMANCE CARBIDES

When the *real* cost of the tools was calculated, the manufacturer found the initial saving with Grade "X" was actually *making* him *lose* more than $100 a week. Here's why:

The real cost of Grade "X" was $3.18 per piece machined (2 pieces from a $6.37 tool). The real cost of Grade 370 is just $.82 (average of 8½ pieces from a $7.01 tool). On the weekly production of 42-43 rolls, the saving totals $100.30!



Graph No. 2—Real Cost Comparisons

Yet even this eye-opening figure does not tell the whole story. The Grade 370 tool operated at twice the speed of Grade "X." It helped save the manufacturer 14 hours a day in labor. It provided twice the tool life. It eliminated a special finishing tool.

When these facts were translated into dollars and cents, the manufacturer found that downtime costs were reduced, because the tool remained on the job longer. Grinding costs were reduced, because the tool required less maintenance. Inventory costs were reduced, because a few tools did the work of many.

When added up, these amounted to a considerable saving—yet nothing in the "Equivalent Grade" Charts could have forecast it. These are savings which buying on the basis of initial cost always obscures. These are savings which more than justify spending a few cents more for carbides with extra production ability.

Carboloy Extra-Performance Carbides available for all steel-cutting jobs

Heavy-Duty Grade 370, used in the test above, is one of three Carboloy Extra-Performance Carbides. Together with Medium-Duty Grade 350 and Finishing Grade 330, these grades cover the entire steel-cutting range from roughing to finishing.

Extra-Performance Grades 330, 350, and 370 cost more, initially, because they are made by a unique and more costly process. But their performance so far exceeds conventional carbides that there are actually no "equivalent" grades for any of them. They cannot be fitted into the arbitrarily selected cubbyholes on the "Equivalent Grade" Charts now in common use.

These Extra-Performance Grades easily expose the fallacy of the "Equivalent Grade" Charts, because they are so superior to other steel-cutting grades. But even when attempting to classify conventional grades, the Charts exhibit the same fatal flaw.

Because there is no way of knowing in advance how any grade will perform on the job, we make this suggestion: Always run your own comparison tests *before* you specify a grade. When the results are in, you will find that one grade will bring your plant significant savings in tool costs, machining and labor expense.

We think you will find *that grade* will be one of the Carboloy Extra-Performance Carbides. But whatever it is, specify it *by name*. Do not settle for an "equivalent" grade.

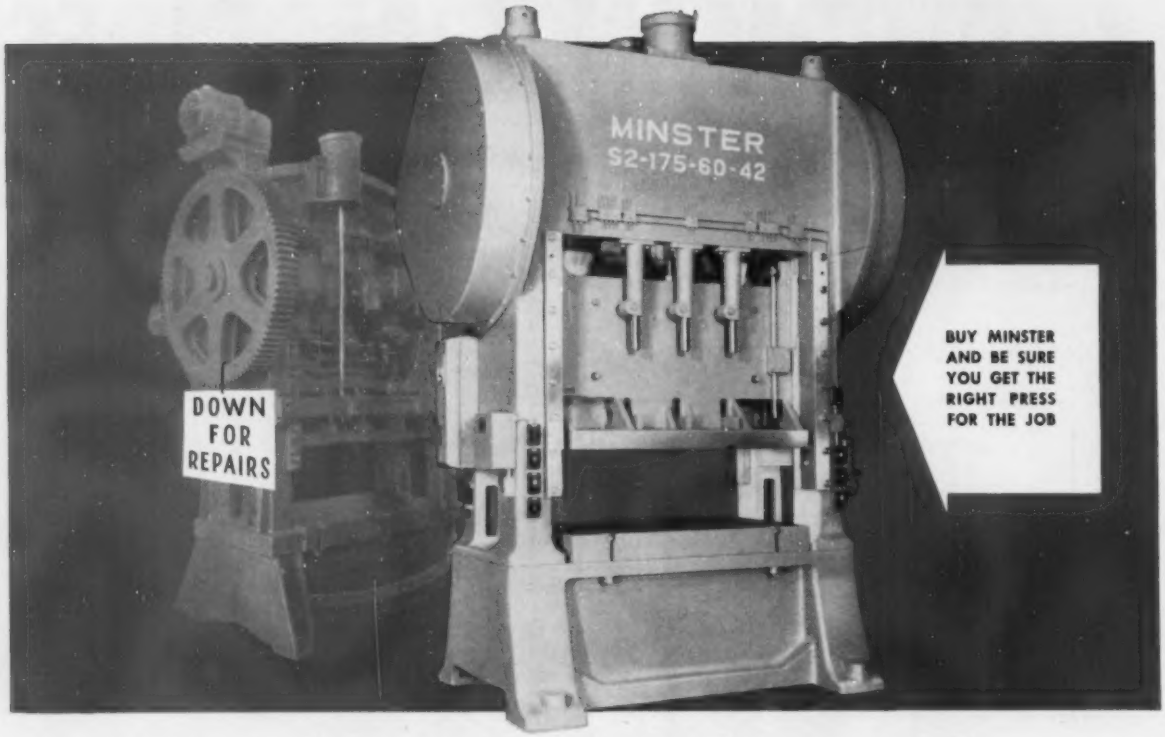
If you would like a more detailed discussion of the whole problem of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a sales engineer to call on you. Send your request to: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Ave., Detroit 32, Michigan.*

CARBOLOY

CEMENTED CARBIDES

AT THE METAL SHOW: "New Worlds in Metalcutting" with Carboloy Cemented Oxide and Carboloy carbide grades 330, 350, and 370. Booth No. 2124.

A Minster Press means
LESS DOWNTIME



Here is why Minster Presses on the job mean more production hours and less downtime for press repair!

1 ADVANCED DESIGN to give you the value of the best practices and latest improvements in presses . . . Box type construction for less deflection and better bearing support . . . Slides having longer ways fully supported and widely spaced . . . Large diameter connection screws . . . Method of taking up wear in lower connection bushings . . . Barrel slide adjustment on all sizes over 60 ton.
Clutch controls, both air and electrical, to improve press operation and production methods.

2 MINSTER'S PATENTED COMBINATION FRICTION CLUTCH AND BRAKE . . . One single automatically synchronized unit having air engaged multiple disc clutch and spring applied brake . . . Fast controlled engagement or disengagement at any point on 360° surfaces . . . Shock absorbing action . . . Exceptional friction surface life. *No more sledge hammer engagement, fast wearing and hard to fit replacement parts.*

3 PRECISION FITTING where it counts . . . Ways scraped to master gauges and square to the slide face . . . Bed scraped to surface plate . . . Bearing bores and bushings honed to fit . . . Ground spacers for maintaining proper gib clearance . . . Ground and roll burnished crankshafts.

4 MAINTENANCE INFORMATION AND OPERATOR INSTRUCTION applying to your press . . . A guide to preventive maintenance and operator training.

Let Minster help you plan your press replacement program

THE MINSTER MACHINE COMPANY

MINSTER, OHIO

MINSTER®

PRESSES

A Report from the

STEEL CENTER of Mid-America

SINCE GRANITE CITY STEEL 1878

BY WATER, BY SHORT-HAUL TRUCK AND RAIL, SHEET STEEL MOVES TO MID-AMERICA FROM ITS OWN CONVENIENT SUPPLIER . . . AND FINISHED PRODUCTS MOVE OUT TO U.S. AND WORLD!

John Marshall, Chairman of the Board and Chief Executive Officer, tells why Granite City Steel plans third major expansion in past seven years.

"They say a great ballplayer is born with the knack of being 'in the right place at the right time' . . . then knows what to do about it.

"That's where we, as a company, find ourselves right now.

"We are the major basic producer of sheet steel ideally located to serve Mid-America . . . at a time when that great bank of states up and down the length of the Mississippi is rapidly developing industrially — building new plants; producing more appliances, automotive parts, building materials, containers, electric motors, farm equipment, highway materials, piping, weapons for defense . . .

"That is why—after two major expansions which have doubled our ingot capacity and given us one of the most complete and modern sheet steel operations in the country—we are now preparing to increase production another 30 percent.

"From the standpoints of location, transportation, service, we are Mid-America's natural steel center . . . and the industrial future of Mid-America looks good to us."

NEW COLOR MOVIE AVAILABLE!

"Steelmakers to Middle America"—takes you through the Granite City Steel plant, shows you how steel is made—now available for FREE group showings. For bookings, write: Public Relations Dept., IA - 63, Granite City Steel Co., Granite City, Ill.

GRANITE CITY STEEL

And subsidiary: Granco Steel Products Co.

Is steam treating an "unknown-quantity" to you?

If you work with metal . . . ferrous or non-ferrous . . . and haven't considered steam atmosphere heat treating for your product, you may find you've overlooked an unsuspected source of surprisingly substantial savings.

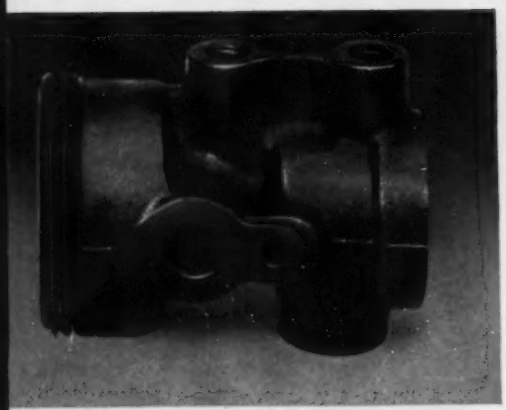
For in scores of plants it's becoming an outstanding cost-cutter on parts made of high speed steel, powdered iron, carbon steel, grey iron, brass aluminum and beryllium copper. And its advantages are almost as numerous as the materials being steam treated.

On high speed cutting tools, for instance, it keeps tools sharp longer. On powdered iron, compressive strength and hardness increase appreciably. On carbon steel it gives a uniform, attractive, blue-black finish. On grey iron it seals against porosity and gives a high degree of corrosion resistance. On non-ferrous parts it produces scale-free work ready for bright dip or often for use "as-is."

Here and on the opposite page are just four examples to illustrate our point. If you want others . . . or details on any of these . . . or want us to help investigate possible savings you can make, just phone your nearest L&N office or write us at 4956 Stenton Ave., Phila. 44, Pa. Catalog TD2-620(1) tells all about it, too; we'll be glad to send you a copy.

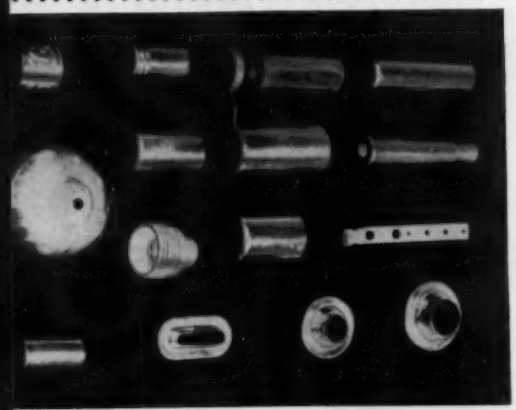
LEEDS NORTHRUP
instruments *automatic controls • furnaces*

***See an operating demonstration** at Booth 1129 at the Metal Show in Cleveland October 8 to 12.*



Replaces Cadmium Plating . . . These grey cast iron valve bodies are used in the pneumatically operated sanders that deliver sand for improved traction under the wheels of trains, trolleys and trucks. Their manufacturer had a double-barreled problem . . . porosity in the castings was causing excessive rejects . . . expensive cadmium plating was necessary to prevent corrosion in service.

Steam treating has solved both problems in one operation. Rejects due to porosity have been eliminated, and many valves previously rejected have been salvaged. Cadmium plating has been eliminated entirely because exhaustive salt spray tests showed the steam-treated finish had a higher resistance to corrosion.

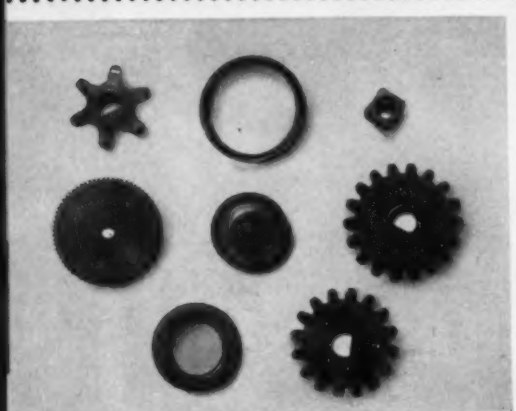


Cuts Expensive Pickling Costs . . . Non-ferrous lipstick tubes and other cosmetic containers made by a large Canadian manufacturer must be annealed before finishing operations can be performed. Scale was a problem. If left on, it ruined tools and dies . . . removing it meant expensive, messy pickling.

The solution was found when sample parts were annealed by the steam Homo® method. When this method was adopted as an integral part of the production line, pickling was eliminated. Subsequent figures from the cost-accounting department showed that eliminating this operation reduced annealing cost by 53 percent.

Puts "Extra-Life" in Cutting Tools . . . A machinery manufacturer faced a tough problem when specifications called for milling a 0.250 inch wide key-way slot into a piece of 4140 cold-rolled bar stock which was heat treated to a hardness of Rc 34 to 38. In addition, tolerances were tight . . . ±0.001 inch . . . with sides perfectly square.

The first high-speed steel tools used produced only four cuts and could not be resharpened because of the close tolerance. Hard-chroming the same tools improved cutter life to about 11 pieces per tool. Carbide tools held up for from 11 to 14 pieces. The next move was steam treating experimental batches of tools in an L&N furnace. The first batch averaged 100 parts per cutter, a second batch, 60 to 70 and a third lot, 100 to 125.



Raises "psi" of Powdered Iron Parts . . . Although many parts made of powdered iron function satisfactorily in the as-sintered condition, there are others where an increase in hardness and compressive strength is an advantage.

This is particularly true of such parts as the steam-treated gears, cams, etc., shown at left, where additional strength is needed on critical bearing surfaces. The shock-absorber piston in the center, for instance, presented a real problem . . . how to meet psi specifications for the thin-section flange around the outer edge. Steam treating proved a cheap, practical solution. Tests showed compressive strength of the flange increased from 1200 to 1400 psi. In addition, the parts, when oil dipped, had a pleasing uniform, blue-black color and high corrosion resistance.

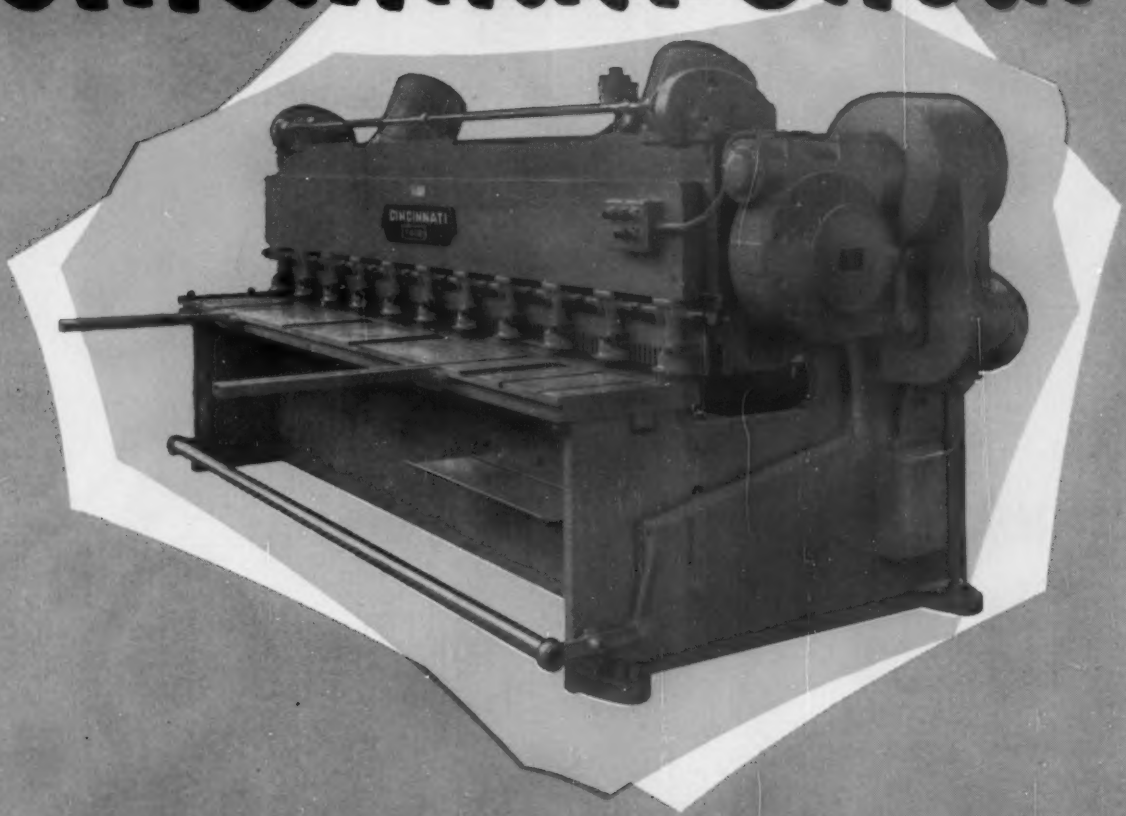
New Accuracy New

New Quiet

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Cincinnati Shears

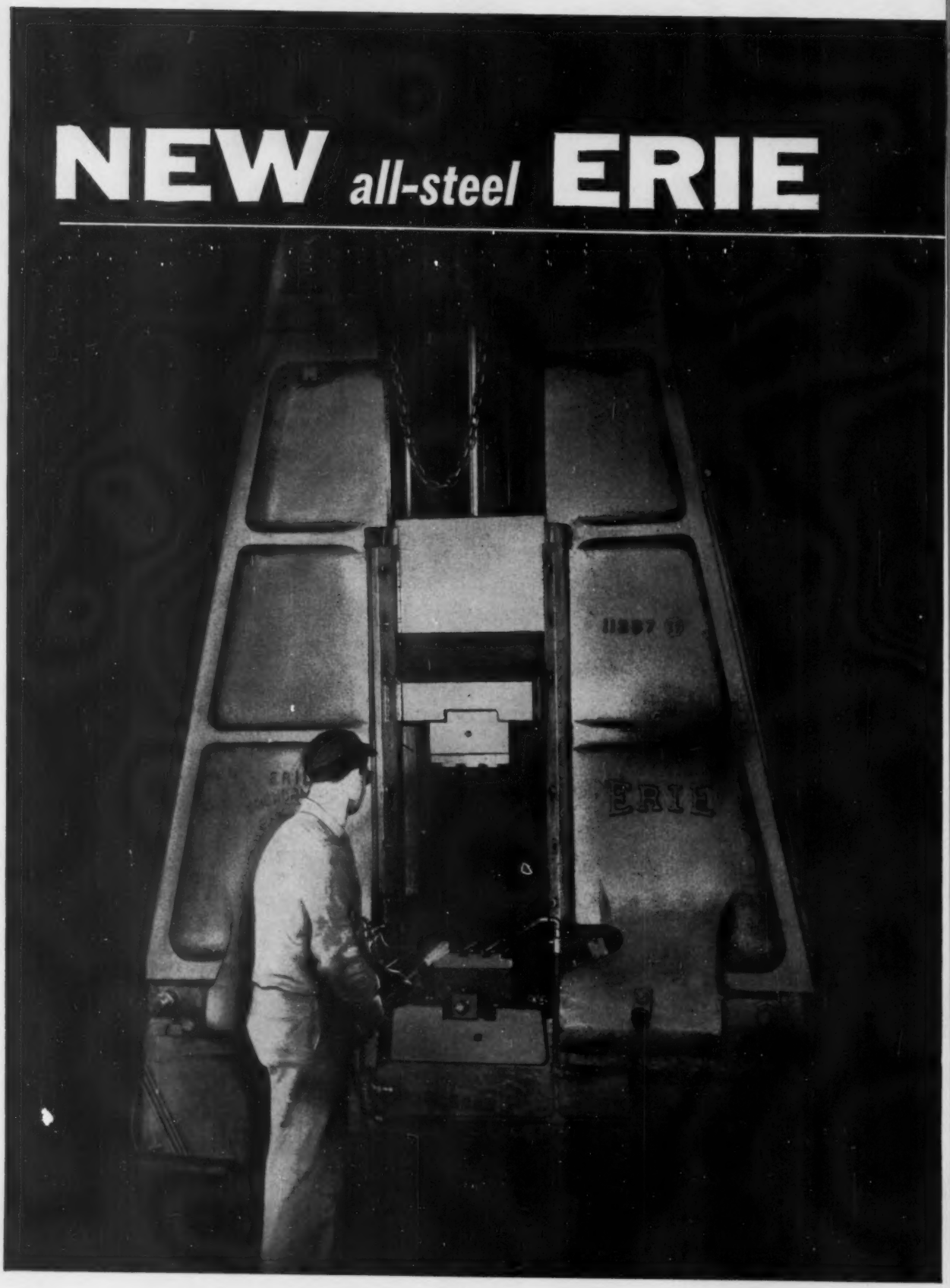


New design in Cincinnati Shears has brought a new quiet and accuracy in performance.

New low rake has increased accuracy—producing blanks to very close tolerances with straight clean edges.

The new design, powerful hydraulic holddowns operate quietly and assure full pressure for holding. Front control of the power back gauge saves time in operation and gives a positive, accurate, easy control of gauging from operator's working position.

Write for catalog S-7R.


NEW all-steel ERIE
ERIE

RIGIDROP

New design piston-lift gravity drop hammer with

New variable stroke control

More guiding surface for closer-tolerance forgings

Safety-streamlined, economical all steel construction

Experienced hammer operators will take quickly to the definite working advantages of this new Erie Rigidrop. It is a brand new concept in a simple-to-operate all-steel production hammer—striking more blows per minute, more easily, and with finer control than ever before realized. Certain shops will find this the most economical hammer they can use in their operations.

Most appreciated in Rigidrop's action is its ability to control stroke variation. This is not simply a short stroke feature, but a *new variable stroke control* allowing you to get *all the range* of strokes between the conventional short and long. Its treadle operates as simply as the accelerator on your automobile—for short fast blows, just press lightly; for longer strokes, apply more foot pressure as desired. And . . . your operator can instantly shift from short strokes to longer, and shift back again just as quickly.

There are many more features of the Rigidrop which will appeal to cost-conscious shops. We'll gladly have an experienced Erie Foundry representative call on you to explain its application—just ask.

Now available in sizes 1500 thru 5000 lbs., inclusive

40% more guiding surface—New Erie guide arrangement provides more accurate guiding of ram and continued maintenance of die adjustment.

Adjustable guides—Guide-Ram adjustments easily made from front and back of Rigidrop at close-to-floor level. Ram can be removed from the hammer at die level, without jacking.

Safety designed throughout—No loose linkage, no overhanging parts on the front of the Rigidrop. An air cushion head provides added protection if the hammer is overstroked.

Built-in inching mechanism—For easy die setups.

Better clamping system—Clamp faces are directly opposite one another to give positive clamping action without bending the rod.

Minimum down time—Never any board replacements.

SINCE 1895—THE GREATEST NAME ERIE *IN FORGING HAMMERS*

ERIE FOUNDRY CO. ERIE, PA.

Oil-Free Chemical Grinding Compound Prevents Wheel Loading, Fights Rust

HOUGHTO-GRIND

Houghto-Grind keeps finishes free from grinding cracks and burns caused by wheel loading because Houghto-Grind's high detergent action keeps grinding wheels clean. Freshly ground surfaces won't rust because they are protected by Houghto-Grind's corrosion inhibiting properties. With Houghto-Grind, the operator can see the work 100 percent of the time. This fluid is absolutely transparent, enabling close and continuous observation when grinding to exact tolerances.

Easy to use, Houghto-Grind mixes with water at room temperature, providing a long-lasting, non-foaming, permanently stable solution. Because there is no oil in it, there is no disposal problem. It will not pollute streams or rivers. Even in periods of prolonged use, Houghto-Grind is free from rancidity or unpleasant odors. A special germicide retards the growth of living organisms that might cause poor health and safety conditions.

Your Houghton man will gladly give you complete details about how you can take profitable advantage of Houghto-Grind's efficiency, economy, transparency and rust-preventing properties. Call him today, or write E. F. Houghton and Company, 303 W. Lehigh Ave., Philadelphia 33, Pa.

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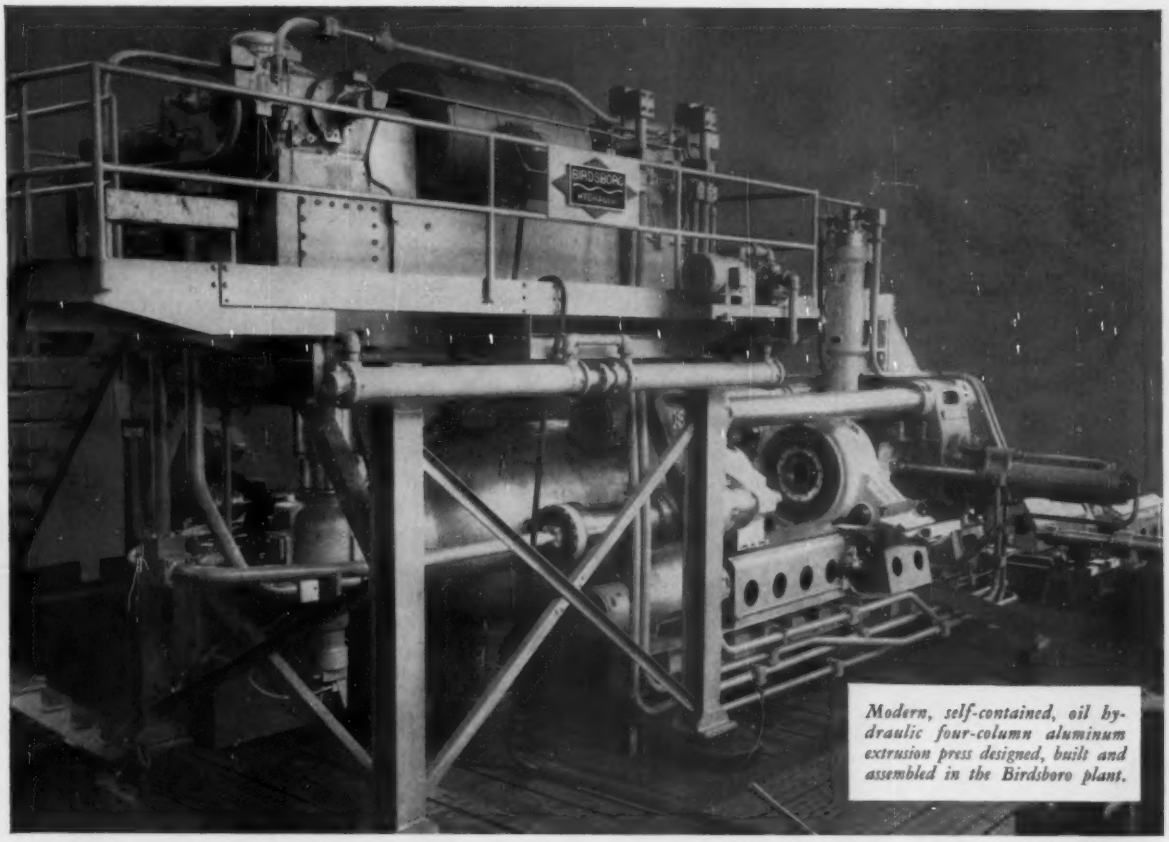
Hydraulic Fluids	Rust Preventives	Grinding Compounds	Special Purpose Lubricants	Heat Treating Materials	Cutting Oils and Bases	Leather and Synthetic Rubber Packings	Pickling Inhibitors



Modern, self-contained, oil hydraulic four-column aluminum extrusion press designed, built and assembled in the Birdsboro plant.

BIRDSBORO DESIGNS NEW EXTRUSION PRESS

for high speed production of intricate aluminum shapes

• Here is Birdsboro's new, modern design press . . . timed to meet today's needs for safe, rapid and efficient extrusion of billets of aluminum and its alloys.

Rated at 2750 ton capacity, the press is capable of making extrusions from billets 8″ to 12″ in diameter x 32″ maximum length. It can also be fitted to handle billets from a general rectangular container 4″ x 16″.

The press features a unique die slide which permits insertion of a die stack in either of two locations. Developed to provide high production, this feature allows extrusion to proceed through one die while a second die stack is being inserted, removed or dressed.

The hydraulic system consists of three large oilgear pumps, two constant delivery at 108 gpm and one featuring electronically controlled variable delivery at 108 gpm.

Discover for yourself how the new line of Birdsboro-designed extrusion presses can give you new shortcuts to low-cost, high-speed production of intricate aluminum shapes. Drop us a note on your company letterhead for additional information.

PHYSICAL DIMENSIONS:

Over-all length	34′6″
Height at highest point over vertical shear	14′8″
Location of Centerline from floor level when installed	3′6″
Weight when installed	380,000 lbs.

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Republic Electro Paintlok® doubles

ONLY ONE COAT OF PAINT on Republic Electro Paintlok, results in a handsome, durable finish for these Temprite water coolers. In addition, Republic ENDURO® Stainless Steel is used for fountain tops to provide life-time beauty and sanitation.

SEVERE FORMING AND BENDING are shrugged off by chemically treated, electro plated zinc surface of Electro Paintlok. In fact, the phosphate coating itself acts as a lubricant for certain forming operations. Send coupon for full details.

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REPUBLIC STEEL

World's Widest Range of Standard Steels

production of existing facilities

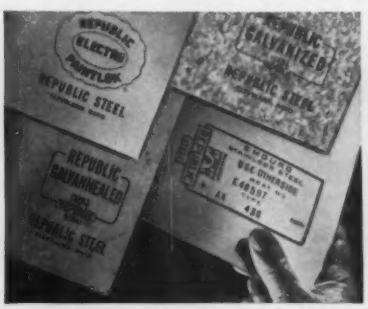
By using Republic Electro Paintlok instead of cold rolled sheet steel for their water cooler housings, Temprite Products Corporation of Birmingham, Michigan, actually double the output of their painting and drying facilities. How? Because only one coat of paint is used on these parts when fabricated from Electro Paintlok, and one pass through the drying oven is sufficient to produce a high-quality, long-lasting finish.

In contrast with this, uncoated sheets for this application required a prime coat before final painting. Temprite found, through experience, that the labor and material cost of the primer coat exceeded the extra cost of Electro Paintlok. Even more important, at today's level of demand *they could not maintain required volume of production when both a primer and final coat of paint had to be applied and dried.*

As a result, Temprite has standardized on Republic Electro Paintlok. And in addition to cost and time savings, they secure a higher quality finish as well. Even when scratched through, Electro Paintlok's chemically treated zinc surface continues to retard corrosion and effectively limits it to the point of original damage.

Add all of these advantages to the fact that Electro Paintlok is delivered from the mill in prime condition for painting and will not rust under approved warehousing conditions . . . and you can see why it will pay you to investigate its use wherever you have a paint adherence problem. Simply contact your Republic representative or mail the coupon for full information.

BUILT-IN SALES APPEAL for the Temprite Club Bar, four-beverage dispenser, is secured through the use of ENDURO Stainless Steel for all housing components. The lustrous beauty of ENDURO harmonizes with any surroundings . . . stays bright and sanitary indefinitely without laborious polishing. Republic makes all analyses of stainless to meet every application. Coupon will bring full information by return mail.



PRODUCTION PROBLEMS VANISH when you specify Republic Steel Sheets. Whatever your requirements, your Republic representative or steel distributor can help you select the ideal type of sheet. He is backed by a broad selection including hot rolled, cold rolled, galvanized, Galvannealed, Electro Paintlok, Electro Zincbond®, Electro Flashcote and other types in a wide variety of analyses.

END PRODUCTION BOTTLENECKS by sending your sheet steel fabricating problems to Republic's Berger Division. You get the benefit of complete contract fabricating facilities, plus a wealth of experience, designed to form high-quality sheet steel into products or components of your own design, *economically*. Investigate this means of cutting tooling costs and plant additions. Mail the coupon for further data, today.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
3104 East 45th Street, Cleveland 27, Ohio

Please send me further information on:

- ☐ Republic Electro Paintlok
- ☐ Republic ENDURO Stainless Steel
- ☐ Berger Division Contract Manufacturing Facilities
- ☐ Republic Sheet Steel (specify)_____

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Address_____

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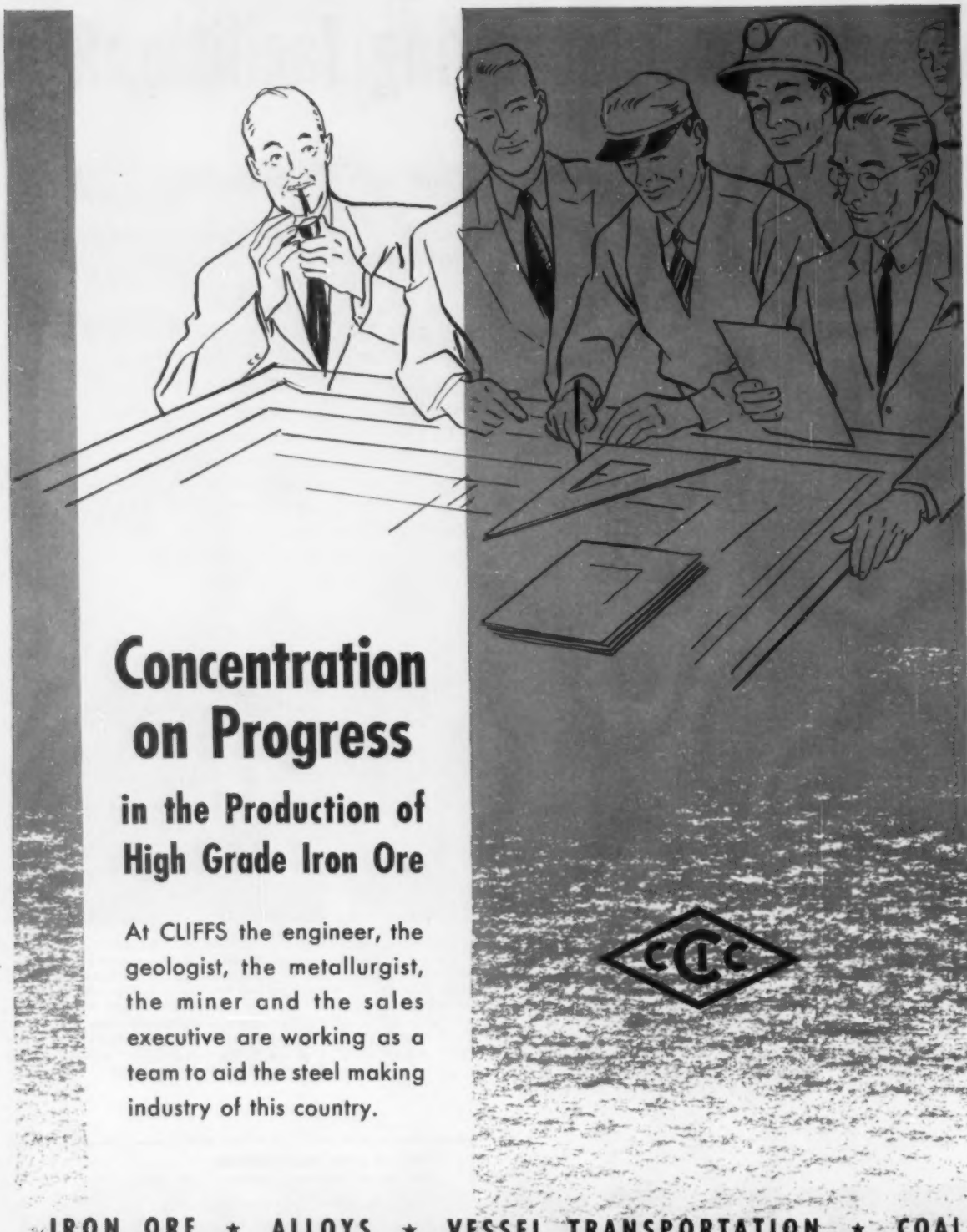


Concentration on Progress

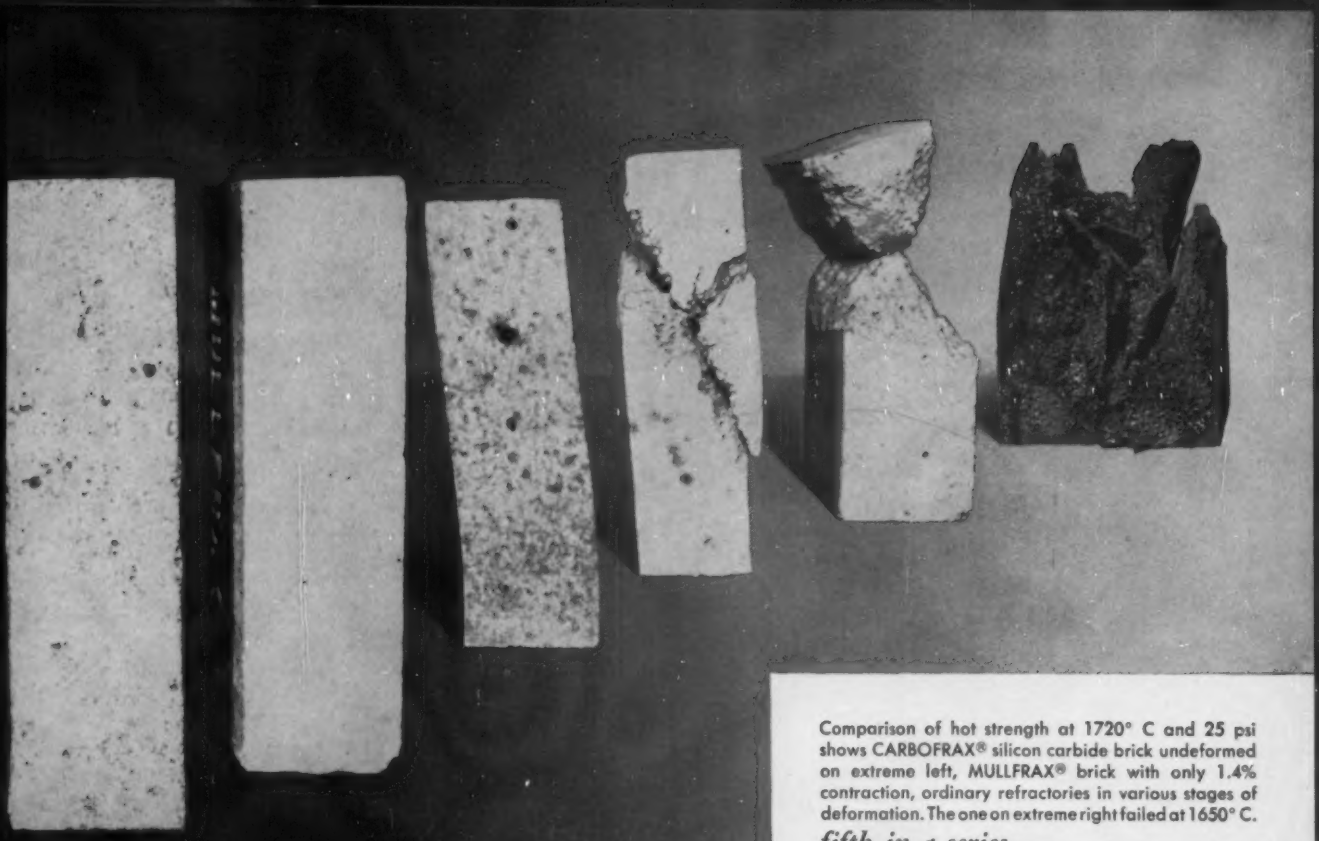
in the Production of High Grade Iron Ore

At CLIFFS the engineer, the geologist, the metallurgist, the miner and the sales executive are working as a team to aid the steel making industry of this country.

IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO



Comparison of hot strength at 1720° C and 25 psi shows CARBOFRAX® silicon carbide brick undeformed on extreme left, MULLFRAX® brick with only 1.4% contraction, ordinary refractories in various stages of deformation. The one on extreme right failed at 1650° C.

fifth in a series . . .

HOT STRENGTH

Unusual Properties of Refractory Materials

Hot Strength—When load is applied to a refractory its ability to resist heat is lessened. Increasing either load or temperature, or both, often causes the refractory to fail.

As these factors are combined in most installations — large and small — hot strength of a refractory takes on new value.

The effect of temperature in combination with load is shown by specimens pictured above. Further tests provided these data: In a test under 50 psi, a MULLFRAX® electric furnace mullite brick showed no linear contraction when held at 1500°C for 100 hours. Ordinary brick contracted an average of 7.58% at 1500°C but that at only 35 psi. In another typical case complete failure (15% contraction) was experienced with a commonly-used refractory at 1350°C and a load of 25 psi.

These differences in hot strength prove this: Where refractories fail under load and temperature, Carborundum refractories have the *extra* resistance needed to avoid slumping and, thereby, to effect less downtime, lowered maintenance costs and greater output.

Hot strength may work in another way, too. It permits use of thinner section refractories, thus reducing overall load. More insulation may be used to lower heat losses.

Carborundum's magazine "Refractories" pinpoints many practical applications for these unusual products. The next issue carries a feature article on "hot strength". Send for your copy today.

CARBORUNDUM

Registered Trade Mark

VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES

CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE

HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

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Dept. B106, Refractories Division

The Carborundum Company, Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

Name_____ Title_____

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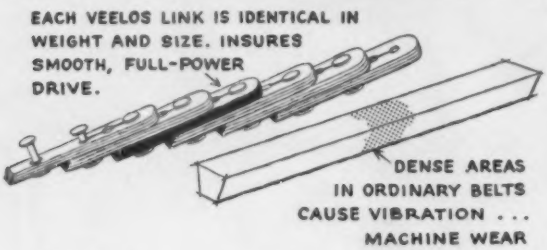
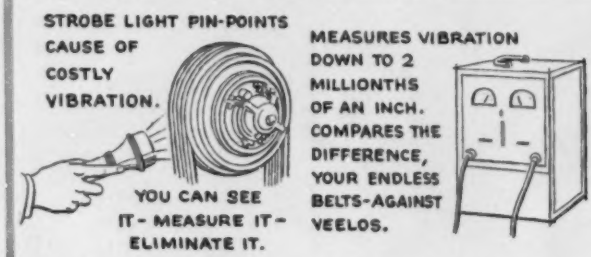
City_____ Zone_____ State_____

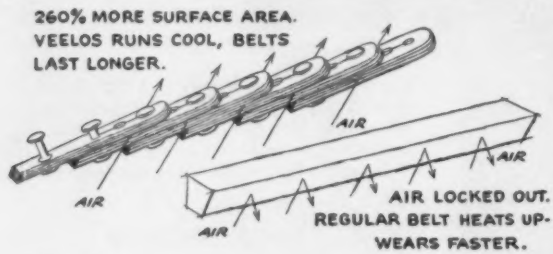
Six Reasons Why Veelos Adjustable V-Belts Are Better For Your Drives!


EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE. INSURES SMOOTH, FULL-POWER DRIVE.
DENSE AREAS IN ORDINARY BELTS CAUSE VIBRATION . . . MACHINE WEAR

1. Balanced construction of Veelos Belts assures you faster, cleaner work, less rejects . . . less bearing wear. Each link and stud is identical in size and weight. Ordinary belts have varying spots of density which cause excess vibration—chatter marks, machine wear.


STROBE LIGHT PIN-POINTS CAUSE OF COSTLY VIBRATION.
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.
MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH. COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS-AGAINST VEELOS.

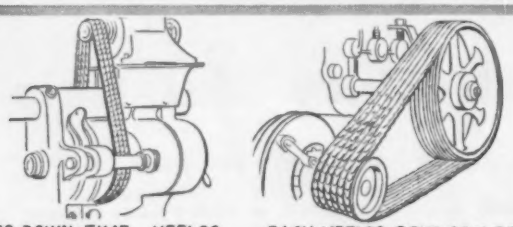
2. Electronic proof—up to 90% less vibration! With a vibration analyzer, you see, on your own machine, how Veelos belts decrease vibration up to 90% over any belt you're now using. This amazing Veelos test pin-points the belt that has the "invisible shakes."



3. Cooler running—long life! Veelos breathes! Constant circulation of air keeps Veelos running smooth. Regular V-belts have no chance to cool, heat builds up from the inside . . . causes slippage, wastes power, heats bearings, reduces belt life.

AREA CONTACT
POINT CONTACT
PERFECT VEELOS FIT. EXTRA THICKNESS AND MACHINE-CUT SIDES PREVENT BOTTOMING. MEAN CONSTANT POWER.
POWERLESS POINT CONTACT OF ORDINARY V-BELT. BULGES, SLIPS, CAUSES UNEVEN SHEAVE WEAR.

4. Greater flexibility reduces slippage! Sectional construction, beveled links allow greater flexibility, longer belt life. Each link moves around sheave independently and maintains full contact, constantly. Full area contact allows shorter centers, smaller sheaves.


NO DOWN-TIME. VEELOS FITS ANY DRIVE - WITHOUT DISMANTLING.
EACH VEELOS BELT CAN BE ADJUSTED - NO NEED FOR EXPENSIVE MATCHED SETS.

5. Simple installation "knocks out" down-time! Saves up to 50% installation time on outboard bearing drives, more when belt length isn't in stock. No resetting, tilting or moving motors. Veelos can be made any length, can be changed by adding or removing links.

6. Veelos won't stretch any more than ordinary endless V-belts when it is properly installed. *Remember—measure Veelos 1" short per foot and roll on drive as tightly as possible.* With the first few revolutions Veelos studs accept a permanent set into the sections they connect.

4 TYPES—FOR ALL DRIVES

REGULAR For general service
OILPROOF For oily and hot drives
COATED For wet or oily drives
STATIC-CONDUCTING For explosive atmosphere

VEELOS
THE BALANCED LINK V-BELT

Known as Veelink outside U.S.A.

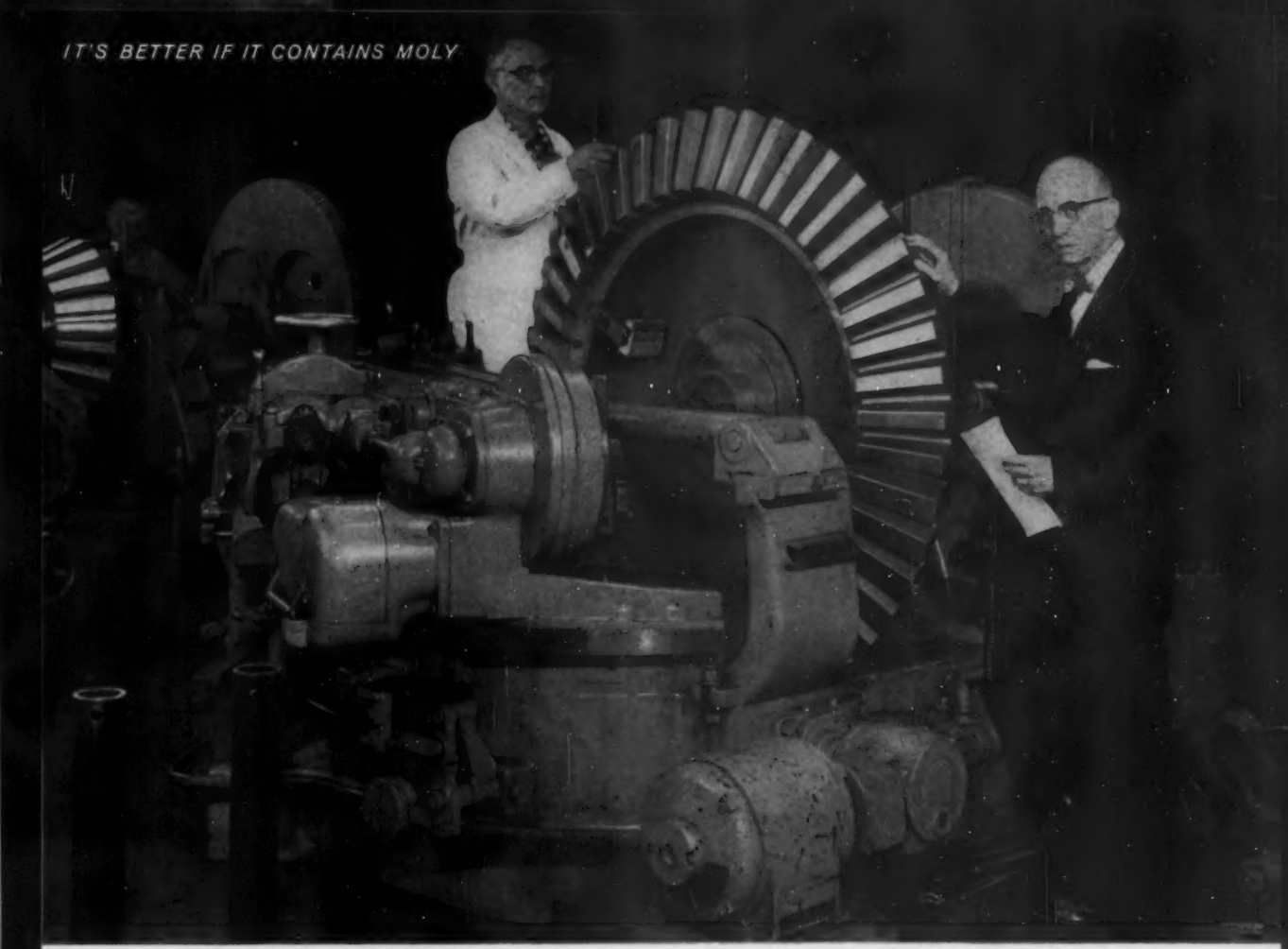
For all sizes and types of drives. Double-V available for serpentine drives.

Write for free Veelos Data Book or Veelos Vibration Demonstration to:

MANHEIM
Manufacturing & Belting Co.
408 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists Since 1911"

© M.M.&B. Co. 1956



E. B. Smiley, Metallurgist for Illinois Gear & Machine Co., looks over setup of large, heavy duty bevel gear made from molybdenum alloy steel casting. This gear has been rough turned, rough cut and heat treated to 269 to 302 Brinell before finish cutting.

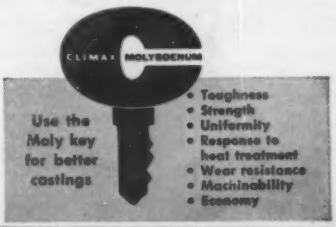
For Strength, Hardness and Machinability gear maker recommends Molybdenum Alloy Steels

"All of our gears are made to customer specifications, and in many cases these include the use of molybdenum steels," says Mr. Smiley, metallurgist for Illinois Gear & Machine Co. "When our customers specify heat-treated gears of plain carbon steel," Mr. Smiley continues, "we often recommend that they change to 4140 alloy containing molybdenum to achieve high strength and hardenability with good machinability."

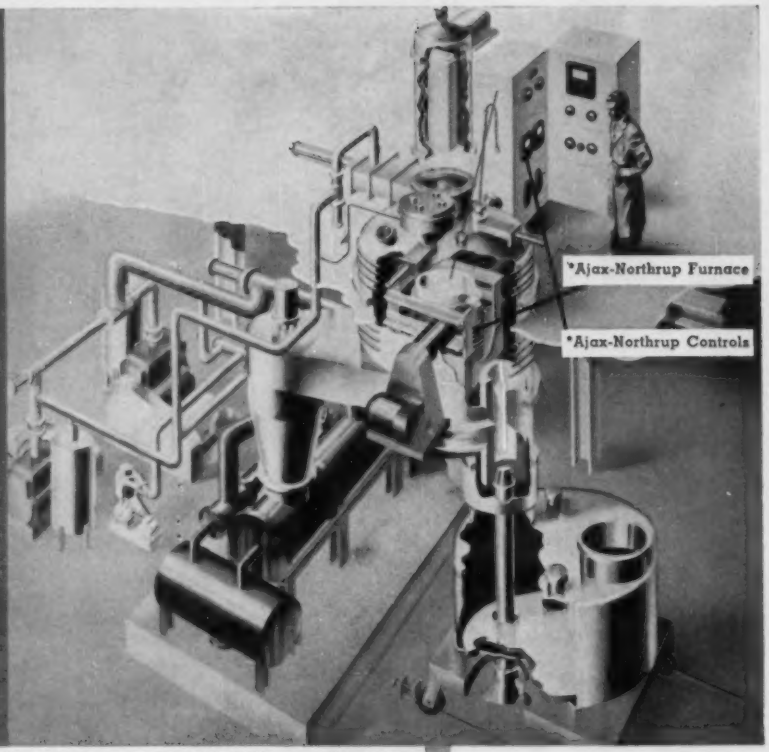
Moly steels offer gear users many advantages over carbon steel. Their greater strength and toughness permit the use of smaller weight-saving gears to transmit a given amount of power. Reduced weight and size of gear housings and other components add to the economy of moly steels. And their higher endurance is an important safety factor.

The properties of moly steels are discussed in a new booklet "Moly Steels for Cast Gears". Full technical assistance is also yours for the asking. Write Climax Molybdenum Co., Dept. 2, New York 36, N. Y.

CLIMAX MOLYBDENUM



nothing new here but the vacuum



Drawing Courtesy Consolidated Vacuum Corporation

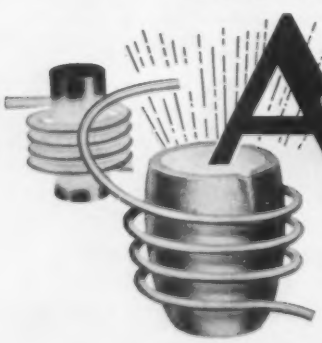
Take away the tank, a few special vacuum features and pumping equipment from this 1000 lb. capacity vacuum melting installation at the Carboloy Department of General Electric Company, and you have the same high quality AJAX-NORTHRUP furnace used for melting the finest alloys elsewhere at Carboloy and throughout the world. You can depend on AJAX-NORTHRUP furnaces for:

- *A clean melt with consistent analysis*
- *Fast, controlled melting*
- *Almost 100% recovery of scrap*
- *Amazing versatility*
- *No fumes, noise, or external heat*
- *Maximum economy and low maintenance*

*For details write AJAX ELECTROTHERMIC CORPORATION, TRENTON 5, N. J.

No induction vacuum melting installation can be any better than the high frequency induction furnace around which it is built. That's why more AJAX-NORTHRUP furnaces are used than any other for this important work.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.

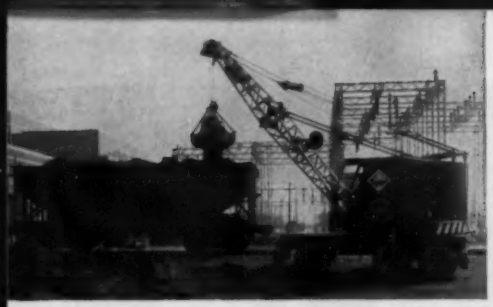


AJAX NORTHRUP SINCE 1916

AJAX

INDUCTION HEATING-MELTING

SEE US AT THE METAL SHOW—BOOTH 1609 (In the Arcade)



With a fast switch from clamshell to hook on the front end, Philadelphia Electric Co.'s Limas handle anything from the loading of slag or ashes to lifting bushings from transformers during repair work. Their three Limas give constant peak performance with maximum flexibility, low maintenance and high availability.

Jones and Laughlin Steel Corporation's Cleveland Works reports, "We really benefit from our Lima's versatility. For several years it loaded limestone at blast furnaces—24 hours a day, 7 days a week without breakdown. Since then, it's been used—with hook or magnet—to load or unload rails, scrap, castings, coil steel and other receivable materials in all parts of the plant. It works in areas where other equipment can't. Performance has been excellent."

In The Midvale Co.'s Philadelphia yard their Lima handles scrap up to 20 tons. They state, "Our Lima does the work of two locomotive cranes. Its faster operation and greater work output has saved us many hours on the job with low maintenance and fuel consumption."

The Cleveland Electric Illuminating Company relates, "By easily interchanging clamshell and hook on the boom, we've used our Lima for general construction work during building of the Eastlake plant . . . coal handling . . . stock materials handling . . . laying tracks and ties for rail spurs . . . moving steel used in high wire work . . . and many other jobs. For four years, it's given us exceptional performance with no major downtime."

Versatile, fast-working LIMAS solved yard materials handling problems for these four users

These and a host of other users across the country are finding wagon and truck mounted Limas best-suited for a wide variety of materials handling assignments. In yard handling operations these rugged, highly mobile machines move anywhere at top speed, get jobs done quickly, dependably and economically. Easily interchangeable front end attachments—shovel, dragline, clamshell, pullshovel or pile driver—give Limas outstanding flexibility for tackling the toughest job requirements under all operating conditions.

It'll be to your advantage to check the complete line of wagon and truck (or crawler) mounted Limas . . . designed and built with Lima quality-extras to give you high output with low operating cost and downtime. Contact your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division—LIMA WORKS

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GALVANIZING TINNING,
DRAWBENCHES, CLASSIFYING

are making news

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NEW "Unionmelt" Welding Assemblies

for greater job versatility- performance dependability

Versatility and dependability are yours at an all time high in an improved new line of UNIONMELT welding assemblies . . . These units embody the greatest variety of machine combinations, job applications, and design features ever offered for submerged arc welding.

Wire feed units are simply constructed and are highly efficient . . . Identical mounting dimensions for heads, brackets, and slides allow for any number of desired assembly combinations.

Welding heads have exceptional flexibility because of sturdy new mounting fixtures which provide for vertical, horizontal, and rotary adjustment. Stationary and self-propelled combinations are also available.

The wide variety of standard and custom UNIONMELT welding assemblies can easily be made to fit your particular applications—at costs lower than many current standard models.

See your local LINDE *representative today for information on the many other new features—or write for free illustrated literature.*

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A Division of Union Carbide and Carbon Corporation
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In Canada: LINDE AIR PRODUCTS COMPANY
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The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation.

A few of the thousands of crankshafts produced at National Forge for new diesel engines.

HAVE YOUR CRANKSHAFTS RECONDITIONED BY A FIRM EXPERIENCED IN MAKING ORIGINAL CRANKSHAFTS

National Forge has been making crankshafts for diesel engines for many years... starting with our own basic electric steel and ending with a shaft ready to install in original equipment, we have a wealth of "know-how" regarding crankshafts.

Recently, National Forge has added a new crankshaft reconditioning division. This includes a large chromium plating department and additional grinding, straightening, and inspection equipment for handling crankshaft reconditioning on a production line basis.

National Forge's large modern facilities and years of experience in producing new crankshafts assure you of proper handling and good workmanship on your reconditioning jobs.

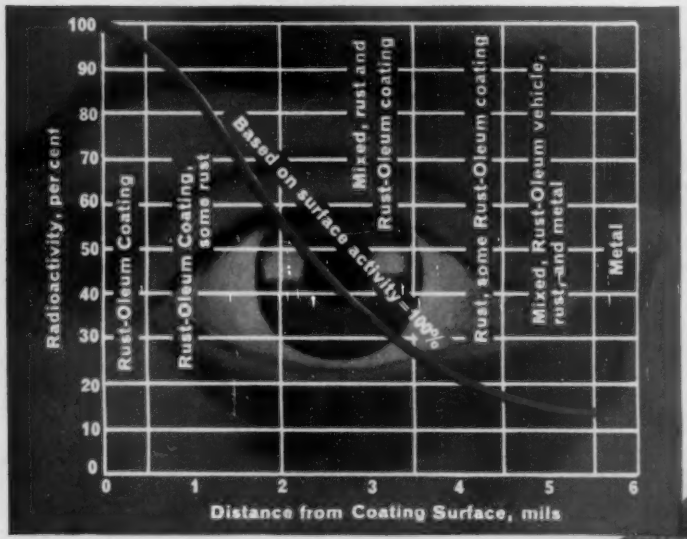
We will be glad to have our field representative call on you to discuss your needs.

NATIONAL FORGE AND ORDNANCE COMPANY

PRODUCES BETTER STEEL FORGINGS AND MACHINE WORK

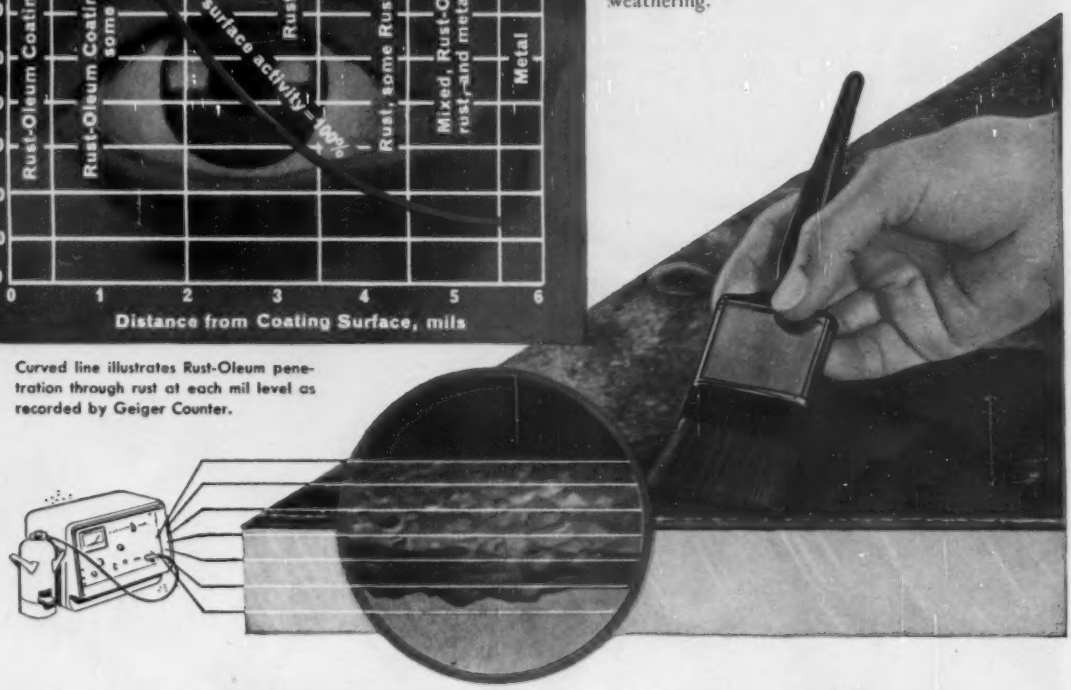
IRVINE, WARREN COUNTY, PENNSYLVANIA

See Rust-Oleum *penetrate rust* to bare metal through the "Eyes" of Radioactivity!



Curved line illustrates Rust-Oleum penetration through rust at each mil level as recorded by Geiger Counter.

Rust-Oleum dries to a firm, decorative coating that resists salt water, sun, fumes, heat, humidity, and weathering.

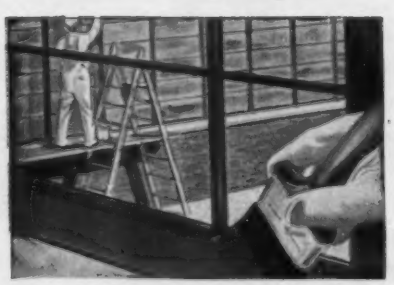


Geiger Counter traces Rust-Oleum penetration to bare metal! In nearly three years of radioactive research, Rust-Oleum's *specially-processed* fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer — then applied to rusted test panels. Rust-Oleum's specially-processed fish oil vehicle was then traced through the rust to bare metal by Geiger Counter.

This penetration means rust-stopping power, because the fish oil vehicle works its way into the tiny pits in the metal where it drives out air and moisture that cause rust. Important savings are yours, because Rust-Oleum can be applied directly over sound rusted surfaces — usually eliminating costly surface preparations. Attach coupon to your business letterhead for your copy of the thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists. Prompt delivery of Rust-Oleum is assured from your nearby industrial distributor.

There is only one Rust-Oleum. It is distinctive as your own fingerprint.

RUST-OLEUM®



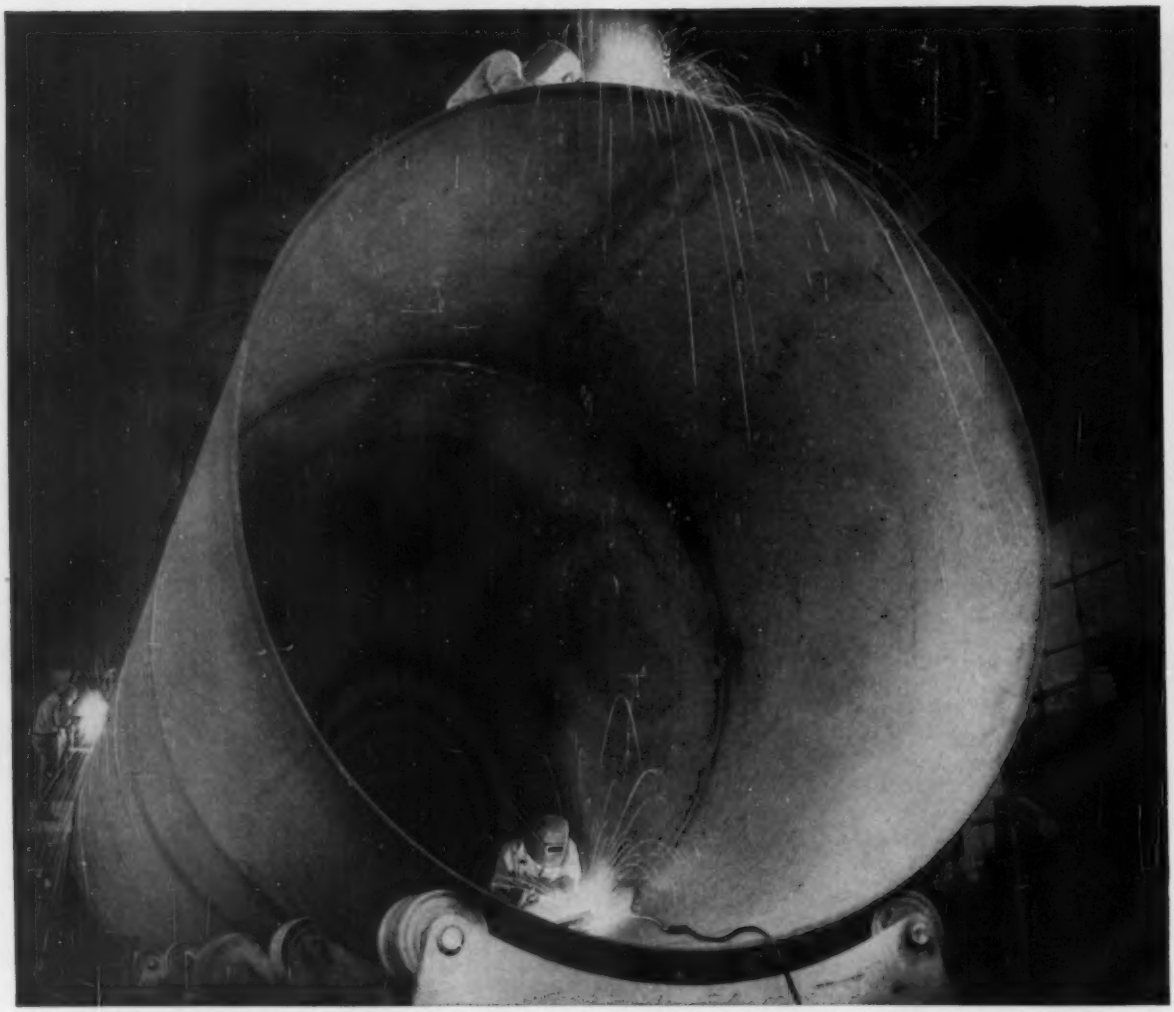
STOPS RUST!

Rust-Oleum is available in practically all colors, including aluminum and white. See our complete catalog in Sweets, or write for information.

ATTACH TO YOUR LETTERHEAD—MAIL TODAY!

Rust-Oleum Corporation
2561 Oakton Street
Evanston, Ill.

- ☐ Complete literature with color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.



This 50,000 gallon capacity air accumulator vessel is one of many under construction by Allied Steel Products Corporation, Newport, Delaware, for a government aircraft development project. Each of the vessels is fabricated entirely of Lukens "T-1" steel.

Fabricator of giant air accumulator says:

"LUKENS HIGH YIELD STRENGTH 'T-1' WELDS EASIER THAN OTHER HIGH-STRENGTH STEELS!"

■ A strong statement—but Lukens "T-1" steel is a remarkable new material. Reports from **Allied Steel Products** say it combines strength and toughness with excellent weldability—as found in no other alloy steel. On this project, every inch of weld was subjected to X-ray inspection.

The greater strength of Lukens "T-1" steel permits reduced plate thickness for a given pressure and vessel diameter. For example, this 11-foot inside diameter air accumulator's shell is only 1¼" thick, and the unit will be hydrostatically tested for a minimum working pressure of 585 psi. Operating temperatures will range from −20° to +125°.

Needless to say, Allied Steel Products looks forward to using Lukens "T-1" steel on other assignments in the very near future.

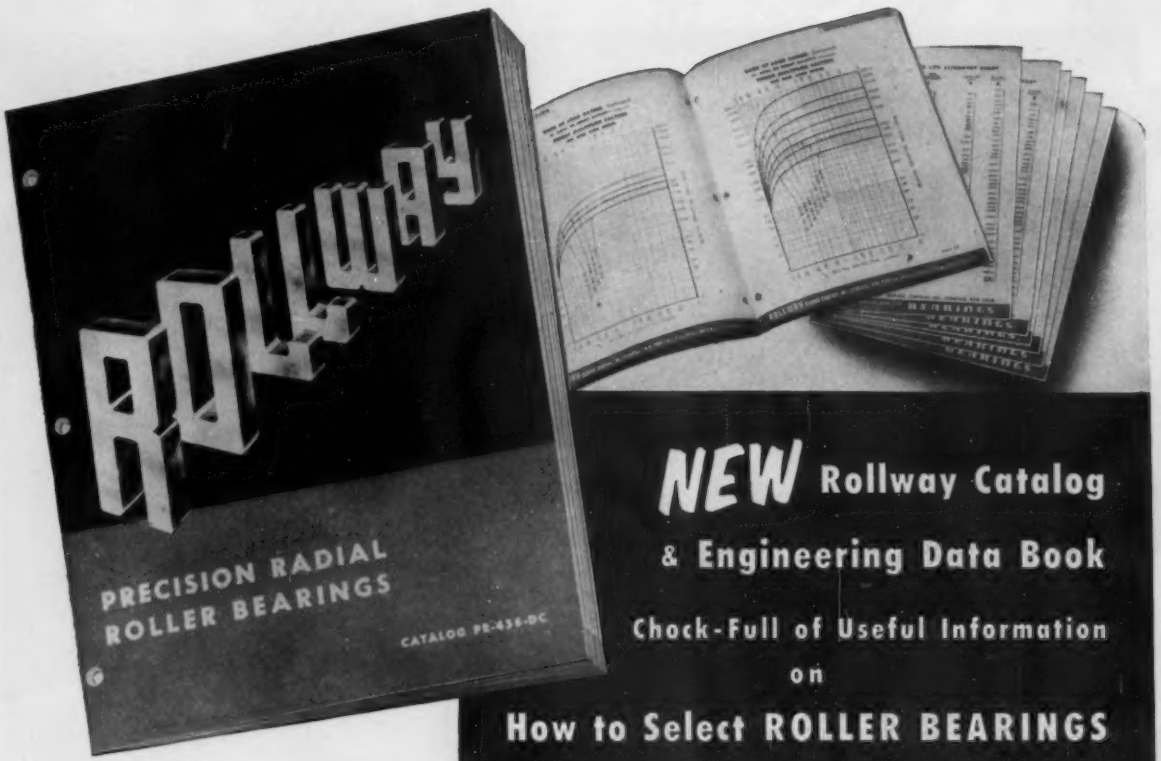
If your problem is equipment weight . . . abrasion, impact or atmospheric corrosion . . . the need for toughness at temperature extremes—it will pay you to investigate this amazing new alloy steel now.

For the latest in fabrication techniques and specifications, write to Manager, Marketing Service, 847 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS "T-1" STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



NEW Rollway Catalog & Engineering Data Book

Chock-Full of Useful Information on How to Select ROLLER BEARINGS

- **Reflects latest RBEC* standards and formulas, PLUS the latest research of Rollway engineers.**
- **Contains the following important data on precision radial roller bearings . . .**

CAPACITIES Detailed information on radial static capacities, radial dynamic capacities, and thrust capacities of cylindrical radial bearings.

Thrust capacities and radial dynamic capacities are given separately. Thrust load does *not* reduce radial capacity nor life expectancy of bearing: It is not necessary to calculate an "Equivalent Radial Load."

APPLICATIONS Load ratings, radial internal clearances temperature allowances, provision for float, alignments, seals, lubrication, etc. . . . all are thoroughly covered, supplemented by engineering drawings of typical applications.

NOMOGRAMS The RBEC* formula is here converted into simple nomogram charts, eliminating complicated selection procedures. You can find in seconds the proper bearing for your application.

PRECISION TABLES Detailed data shows the tolerances achieved with varying degrees of precision. Complete tables include limits for shaft diameters and housing bores to obtain proper type of fit of inner and outer races for various operating conditions.

*Roller Bearing Engineers' Comm.—Anti-Friction Bearing Mfrs. Assn.

Send for Your **FREE** *Copy Today!*

Included with the new Rollway handbook-catalog are extra copies of the nomogram charts. Send for yours today!

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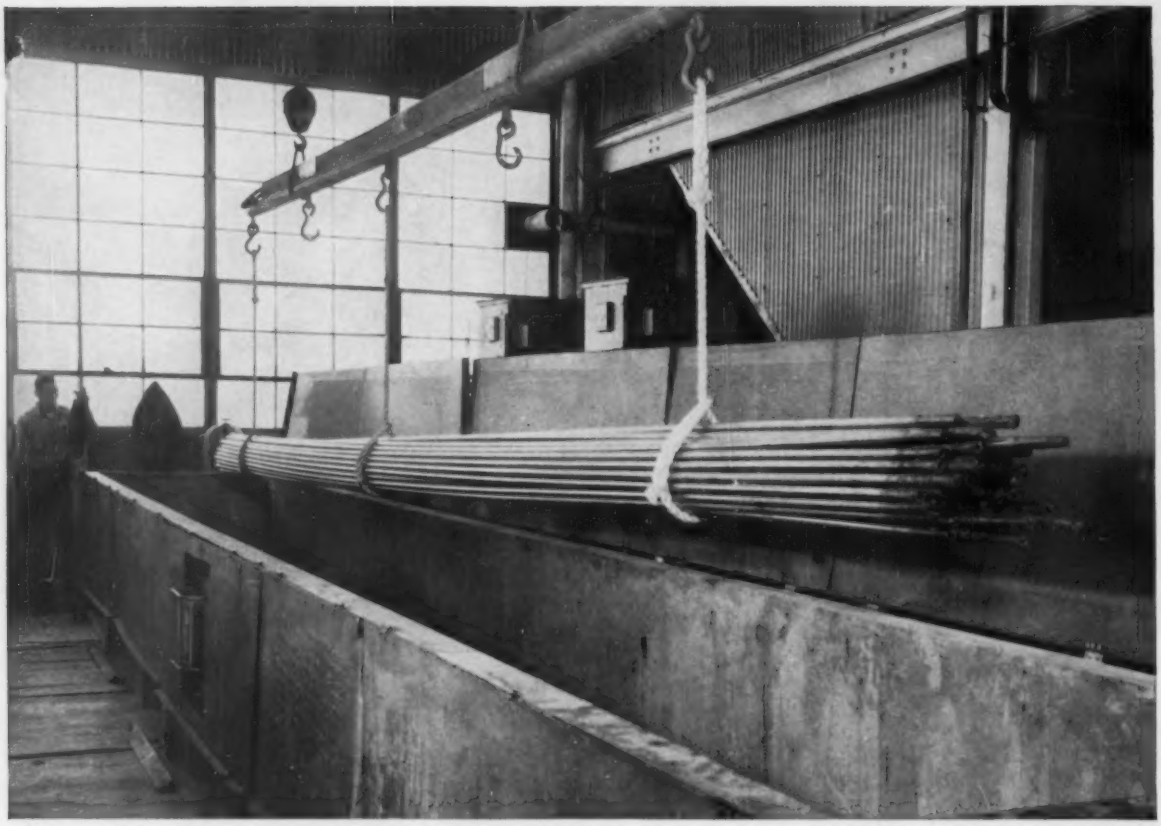


Sawhill Tubular Products reports:

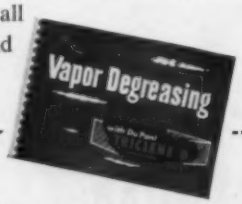
"Thorough cleaning, no etching when we degrease tubing with TRICLENE® D"

"We've bought 'Triclene' D by the tank-wagon load since it first came on the market," says Mr. C. H. Albright, General Purchasing Agent of Sawhill Tubular Products, Inc., Sharon, Pa. "And it's the most efficient solvent we've found for degreasing stainless- and carbon-steel capillary tubing—inside and out.

"In addition to thorough, trouble-free cleaning, 'Triclene' D also makes our next operation—annealing—much easier. Here, any residue on metal surfaces affects the quality of the anneal. After switching to 'Triclene' D, we noticed a healthy reduction in the number of rejects."

Other advantages noted by Sawhill were easier solvent control, steadier pH and no etching on highly polished surfaces. In short, Sawhill had fewer solvent worries.

GET ALL THE FACTS about "Triclene" D and vapor degreasing in this new 42-page booklet. Here you'll see how this rugged solvent is used for all metals and in all industries. Send for your free copy today.



TRICLENE® D
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BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

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Electrochemicals Department IA-10
Wilmington 98, Delaware

☐ Please send me a copy of your new vapor-degreasing booklet.
☐ Please have your Representative phone for an appointment.

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____

Get the *right* answers to your Roll problems from "YOUNGSTOWN"

hot and cold strip mill maintenance specialists

Q. How can scratching, galling, pickup, and excess wear be eliminated?

A. Use PARALLOY... the Rolls of uniform hardness all through. Roll more tonnage from new to scrap diameter.

PARALLOY

HOT STRIP COILER ROLLS • COILER PINCH ROLLS
PICKLING LINE PINCH ROLLS • UPCOILER ROLLS
CLEANING LINE PINCH ROLLS • SINKER ROLLS
CARRIER ROLLS • TEMPER MILL TENSION ROLLS

Q. How can heat check, warpage and cracking be overcome?

A. Let Youngstown's proven experience with Ductile Cast Iron help you in the applications at right.

DUCTILE IRON

RUNOUT TABLE ROLLS • HOLDING TABLE ROLLS
LOOPER TABLE ROLLS
LOOPER TABLES • APRON PLATES

Ductile Cast Iron Rolls are reducing maintenance in hot strip mills . . . especially good under the sprays. We invite your inquiries on rolls or any other ductile iron castings up to 50,000 pounds.

The Youngstown Foundry & Machine Co.
SERVING INDUSTRY SINCE 1883
Youngstown, Ohio

WHEN THE BACK NEEDED A BREAK

Time was, and not too long ago, when industry used to spend almost as much time moving products as in making them. Then right before our eyes a whole new industry evolved, dedicated to the efficient, mechanized handling of materials. Today, the wizardry of materials handling people has not only sliced substantial cost items from industry's expense sheets, but has won the eternal gratitude of working men everywhere. Better steels have contributed to the developments in materials handling. And at Inland, we've been giving progress a push by providing the *right* steels to this important industry.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Detroit, Indianapolis, New York. Steel products supplied to the materials handling industry include sheets and strip, Ti-Co galvanized sheets, bars, plates, structurals, 4-Way safety plate. Other products: tin mill products, reinforcing bars, rails and track accessories, coal chemicals.*

NEWSFRONT

Automation—Scaled To Jobbers

Machine tool makers are seriously considering automation as an aid to selling jobbers. At least one tool will be marketed soon with a tape control system, and is designed specifically for the job-shop market. Idea is that the jobber supplying small quantities of a similar product over a long period can simply put the specs on tape, then make short runs without long setup operator retraining times.

Inside Story On Stainless Steel

Stainless may be gaining ground as a material for auto insides. Latest application is in car radiators. Development of a stainless steel baffle plate comes on top of a recent application of stainless in piston rings; may indicate Detroit is coming around to the metal more for functional, internal uses.

No Worries Over Industrial Oil

Top Administration defense planners say, ease up on your oil worries. Industrial users don't have to fret over possibility of rationing or short supplies, regardless of what develops in the Suez crisis. Present U. S. crude oil imports from the Middle East total 300,000 bbl per day —a loss domestic producers could easily compensate for, say the experts.

Treasure-Chest Electron Tube

Gold solder, sapphire bearings, various silver parts (because of low electrical resistance) characterize a new electron tube. Tungsten and tantalum are additional metals used. For extremely high frequency use, the "retarding field oscillator" tube offers large power outputs at 70,000 megacycles; reduced power at 100,000 megacycles.

$H_2 + O_2 =$ Electrical Current

Production of electrical current from the chemical combination of hydrogen and oxygen is receiving serious attention. Still in development stages, the process is actually more efficient than many other means of electric generation. As costs of gas production continue to decrease, the process (which produces water as a by-product) increases in economic feasibility for special applications.

New-Type Light: A Metals Market?

Almost shadowless, a new light system which changes color as activating frequencies are varied may soon open up a significant market for metals. Now in advanced development, the technique employs a solid panel coated with phosphors. This is sandwiched between (and energized by) aluminum foil conductors. Potential efficiency is rated better than most other types.

Fuel Injection's Fight Begins

Fuel injection will appear on a few '57 cars, but the competition between injection, conventional carburetion is just beginning to reach high pitch. Relatively high cost of injection is one stumbling block. Another holding back fuller acceptance by engineers is lack of experience with their own, other make systems.

Transistors: Made To Last

Recently-concluded reliability and life tests (including firing from a mortar) show today's transistors offer amazing longevity. Leading producer conducting them says they show transistors may never require replacement in radios, other electronic devices; will far outlast vacuum tubes. Mortar (shock) tests left 60 to 70 pct unimpaired.

Jet Roar Poses Metals Problem

Fact that jet engines are becoming increasingly full of sound and fury signifies plenty. British aeroneutical researchers say jet plane noise is becoming so intense it can effect structural failures of the metals used in the plane. Recognition of noise's role may mean increasing acceptance of delta wing, other unconventional designs, so noise can dissipate harmlessly by issuing from extreme tail-end of the craft.

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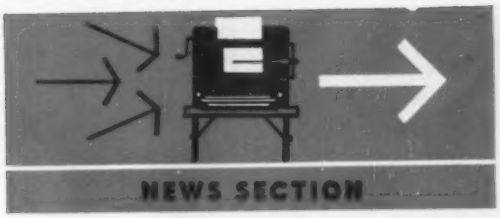
CHEMICALS ACP PROCESSES



The Real Issues Behind Taft-Hartley

After nearly 10 years of controversy, T-H still survives . . . But its issues have changed . . . Right-to-work clause is now labor's top priority target . . . Emphasis on amendment, repeal unlikely—By *R. D. Raddant.*

◆ THOSE OLD FIGHTING WORDS of labor relations, Taft-Hartley, are again headed for the political mill.

With both political parties calling for T-H action in their platforms, the Labor Management Relations Act of 1947, which it is almost never called, is still a political issue.

True, it is not the violent issue of other years. It is seldom referred to these days as a slave labor act and labor leaders don't get purple with rage when it is mentioned. But it's still very much alive and kicking.

Platform Planks

The Republican platform calls for amendment, the Democratic for outright repeal of the act that has been the law under which labor and management have negotiated for almost 10 years. It has been durable enough to survive three Democratic Congresses and one Republican.

Recalling that even the law's authors, Congressman Fred Hartley and the late Senator Robert Taft, conceded the law's imperfections, what has accounted for its amazing durability?

And, in the face of its resistance to change, what, if any, action is likely in the next sessions of congress?

Repeal Unlikely

First, regardless of which party controls the White House and Congress, repeal is unlikely. Even labor leaders have shifted their effective attacks to specific provisions of the act, although at the same time talking loudly about repeal.

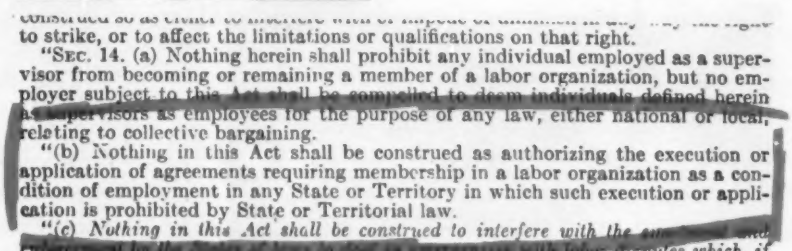
Second, focal points of attack have changed in the nine years of the act's existence. Some of the hottest points at issue in the early years of T-H are scarcely heard from today. But changing times have placed new emphasis on others.

In general, most vocal criticism of Taft-Hartley comes from labor. Business also has its criticisms, but generally has been able to handle its labor problems under the act. Business might be more eager to press for amendments it feels would improve the act, but hesitates to open the doors to wholesale revision.

Primary target of labor's T-H attack is no longer the injunction, which raised all the noise in the coal and steel strikes in the period shortly after the law's adoption over President Truman's veto.

Labor's principal target is now concentrated on a small clause,

Sec. 14 (b): Labor's Primary T-H Target



construed so as either to interfere with or impede or diminish in any way the right to strike, or to affect the limitations or qualifications on that right.

"SEC. 14. (a) Nothing herein shall prohibit any individual employed as a supervisor from becoming or remaining a member of a labor organization, but no employer subject to this Act shall be compelled to deem individuals defined herein as supervisors as employees for the purpose of any law, either national or local, relating to collective bargaining.

"(b) Nothing in this Act shall be construed as authorizing the execution or application of agreements requiring membership in a labor organization as a condition of employment in any State or Territory in which such execution or application is prohibited by State or Territorial law.

"*(c) Nothing in this Act shall be construed to interfere with the* [redacted] *permitted to occur or continue, will constitute a* [redacted]

- **This section permits states to adopt so-called right-to-work laws. In effect in 17 southern states, they prohibit union shop, or compulsory unionism. That's why it's a prime labor target.**
- **If successful in repeal, one Federal amendment would wipe out in a single stroke all state right-to-work laws.**
- **The alternative is the long, expensive, and nearly impossible task of obtaining repeal of the laws in each individual state.**
- **But another effect is that it raises the issue of states' rights, thereby intensifying southern opposition. Southern Democrats have been solid in opposing action on Taft-Hartley.**

SPECIAL REPORT

Section 14 (b). Its biggest guns are being brought to bear on that one short section.

It is this one paragraph that authorizes individual states to adopt the controversial right-to-work laws, which are now in effect in 17 southern states. It states:

"Nothing in this act shall be construed as authorizing the execution or application of agreements requiring membership in a labor organization as a condition of employment in any state or territory in which such execution or application is prohibited by state or territorial law."

In other words, although the union shop is permitted by T-H, it gives the power to states to prohibit it in now controversial, so-called right-to-work laws.

Labor is now involved in a costly, extensive campaign to gain repeal of right-to-work laws in individual states. If it could win repeal of this one section of T-H, that single action would invalidate the right-to-work laws.

Union officials publicly may put union security, restrictions on boycotts, injunctions, union liability for damages, or others at the top of the list of T-H objections.

But Sec. 14-B is the real top priority target, although a difficult one, even though Sec. of Labor James Mitchell has stated he is opposed to right-to-work laws. Probability of a Republican-Southern Democrat coalition indicates that Sec. 14 (b) will survive, regardless of the outcome of the November elections.

Any prediction of Taft-Hartley's fate in future sessions of Congress demands a short look at previous congressional attempts to change the act.

In 1954 President Eisenhower recommended 14 revisions of the law to a Republican 83rd Congress. (This resulted in the resignation of the then secretary of labor, the late Martin Durkin.) Hearings were held in both House and Senate labor committees, and a Senate bill was reported out of committee. It included most of the President's recommendations, but with a few exceptions.

But this bill was recommitted to the committee by Senate vote. Democrats voted unanimously for the first time in history, to recommit the bill.

Barden's Iron Hand

The House Labor Committee was about to report out its own version, but didn't take the action when the Senate recommitted its bill.

In the last session of Congress, the 84th, with the Democrats in control, the House Committee, under Rep. Graham Barden, N. C., outspoken opponent of repeal, did not even call a hearing on the bill. Nor was a serious attempt made in the Senate for T-H action.

Looking ahead beyond the election, here is the situation in brief:

If the Republicans control Congress, action is more apt to follow the pattern of the 83rd Congress. If the Democrats win, the makeup of committees will be just about the same as in the 84th.

Close Margin

A key figure in labor legislation is Rep. Barden. He does not want T-H action, and rules his committee with an iron hand. But the margin is close. The committee today is made up of 17 Democrats, 15 of whom would go for outright repeal, and 13 Republicans. In general, southern Democrats align themselves with Republicans on T-H, or take an even stronger stand.

In the Senate, Senator Lister Hill is committee chairman, but he avoids labor controversy, turning these matters over to a subcommitee under Sen. Paul Douglas. This committee, with Sen. Hill the only southerner, is much stronger for repeal than the House. But on the floor, the same alliance of Republicans and southern Democrats is the rule on labor.

Sec. of Labor James P. Mitchell, in huddle here with David McDonald, head of USW, is a key figure in making Administration labor policy.

The Administration and Labor

- **President Eisenhower originally asked for 14 changes in T-H. In spite of long hearings in Congressional committee, no changes have yet been made.**
- **Ike and his advisers are taking a new look at labor policies, based on changing times and conditions since his original recommendations.**
- **If Ike is re-elected, he will again ask T-H amendment, may make specific recommendations before election.**

In evaluating any future T-H action in Congress, Sec. 14 (b) again rears its head. In addition to permitting right-to-work laws, it raises the issue of states' rights, fighting words to any southerner.

In a Democratic Congress, it's possible that a recommendation including repeal of this section could come out of the Senate Committee, but much less likely from the House.

It is now frequently stated by labor experts on Capitol Hill that amendment to T-H is more likely under a Republican administration and Congress than a Democratic. This theory, incidentally, is even being pushed by the GOP national committee, which is going after labor support.

Reasoning is that Ike will strongly recommend amendment of T-H. Team Republicans in the House and Senate will go along, with enough northern Democrats to over-ride those who would be unequivocally opposed. This could break up the Republican-Southern Democrat alliance that has previously blocked action.

Labor Still Bitter

Going back to labor's demands for repeal or amendment, it is misleading to get the idea that labor leaders are really not strongly opposed to T-H, but use it only as an issue. The real pros are as bitterly opposed to some of its measures now as when it was adopted.

"Labor's objections are realistic, and they are strong," J. Albert Woll, general counsel of the American Federation of Labor, told THE IRON AGE. "Labor will not rest until a labor-management act is passed that is fair. Labor is not satisfied to hold on to T-H as an issue. A vital part of labor's program is to get a fair act."

After the right-to-work provision, labor's chief objections involve what it considers threats to union security, injunctions, liability, bans on political contributions. AFL unions, particularly the Teamsters and building trades, are bitterly opposed to the act's prohibiting secondary boycotts. This is of less concern to CIO industrial unions.

The national emergency injunction, which was once a big issue in the early days of T-H when it was dramatized by the coal and steel strikes, is no longer a significant issue. It is almost inconceivable that any labor legislation would be enacted without some national emergency provision.

Management Critical

It is generally assumed that T-H is unanimously defended by management on all points as a purely pro-management law. Although much less vocal, management also criticizes many points of T-H.

The National Association of Manufacturers, for example, wants free speech guarantees strengthened, recognition strikes prohibited, provisions against featherbedding, redefining of secondary boycotts to strengthen the law, among other points.

President Eisenhower's original 14 points weren't approved unanimously by either labor or management. Labor charged they did not go far enough, and Mr. Durkin felt compelled to resign from the cabinet. But management felt that some points should be strengthened, and also opposed some of the White House suggestions.

But they remained the Administration's official labor policy right up to the moment. But the President and his advisers are now reviewing the act in light of current situation. If re-elected, the President will make new recommendations, some stronger, but others more favorable to labor.

The fact that the National Republican Committee has a labor policy section directed by Roy James, former staff member of the Senate Labor Committee, indicates the importance the GOP places on picking off a large number of labor votes.

Sec. Mitchell is not unfriendly to labor. He has many backers in top labor eschelons.

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The Real Issue Involved in T-H

1. Sec. 14 (B), Authorizing Right-to-Work Laws

Now labor's prime target. Repeal of this section would wipe out right-to-work laws in 17 states.

2. Provisions Prohibiting Secondary Boycotts

AFL unions particularly want these provisions eased. This is also a key point to business, which would like to see them intact or strengthened. Activities of the Teamsters are responsible for much of the bitterness.

3. Injunctions

Once labor's top target, national emergency injunction is not a real issue. But labor bitterly opposes the preliminary injunction, believes the injunction has no place in labor relations.

4. Restrictions on Political Contributions

Not a key issue, but of strong interest to both labor and management. Labor wants no restrictions on political activity or right to make direct contributions. Management believes there are too many loopholes.

5. Misinterpretations

Both labor and management contend the law is subject to misinterpretations. Business sometimes contends NLRB rulings are pro-labor.

PRODUCTION

REFRACTORIES: Odds Are on Basic Brick

Demand for more production in less time sparks trend to more use of basic brick . . . Some all-basic openhearths are in service and show good results . . . Steel expansion pushes refractories—By G. J. McManus.

◆ REFRACTORY makers are betting heavily on the future of basic brick. One new all-basic plant has just been opened; three more in this country and Canada will bring the total to eleven.

Newest basic refractory plant is the $5 million Columbiana, O., installation of Kaiser Aluminum & Chemical Corp. It will give Kaiser an Eastern producing point to supplement an older basic plant near Salinas, Calif.

Harbison-Walker (biggest refractory producer) is putting in a new basic plant at Hammond, Ind. The company now produces basic refractories at Baltimore; Warm Springs, Calif; Marelon, Quebec; as well as at other foreign points.

More to Come

General Refractories (biggest basic producer) is adding an all-basic plant at Gary, Ind., and one outside Hamilton, Ont. General now has basic plants at Baltimore and on the West Coast.

In addition to these new installations, E. J. Lavino & Co. has two basic plants, one at Plymouth Meeting, Pa., and one in Newark, Calif.

Expansion of basic facilities is partly the result of increased demand for all refractory products. Except for the steel strike period, refractory sales have been running 10-15 pct over last year's $400 million rate. Early August was a little slow but September has seen orders snap back to the high level of earlier months.

In line with growing needs, refractory makers have been expanding fireclay and silica facilities as well as basic. North American Refractories is starting work this fall on a $300,000 research and development laboratory at Curwensville, Pa. A. P. Green, Mexico Refractories, Laclede Christy and others have expansion programs going (Iron Age, June 7).

Use More Basic

But new activity centers on basic refractories. The iron and steel industries take about 60 pct of all refractories. Biggest single bite is taken by openhearths and here the swing has been toward basic. Magnesite, chrome, and fosterite bricks are going into openhearths in growing quantities. Ten years ago the working rule was 4 to 6 lb of basic refractory to every ton of steel. Today the figure is 9 lb of basic to a ton of steel.

Behind this growth is a push for more steel production through hotter furnaces and less downtime. Basic bricks in openhearth roofs have taken temperatures over 3200°F. Limit for silica brick is around 3000°F. The performance of basic brick has led to its widespread (but not universal) use in the walls of openhearths and in the top courses of regenerator checkers. In openhearth applications, metal case basic bricks with imbedded plates are currently favored.

In the newer openhearths, basic brick is being used in port ends, including the roofs. And in five existing and two proposed openhearths, basic is used in the main roofs. This construction, called the all-basic, has been employed for 10 years by U. S. Steel.

A Look At All-Basic's Record

◆ U. S. STEEL has had the longest experience with all-basic construction. Thinking at the Corporation is reported to boil down to this: Overall costs are the same with basic or silica; production gains with basic come to 10-20 pct.

These gains may be strictly theoretical. A mill that has dropped the time of heats to 10 hours may have reached the limit of charging capacity with existing equipment. On the other hand, there is little question but that basic construction can yield important time savings under the proper conditions. One all-basic openhearth has turned out heats in under eight hours. This was in a modern shop and the furnace was given preferential charging.

Another point to be considered is initial cost. As they are now being built, all-basic furnaces have suspended roofs. The structural work involved in converting a furnace for basic roofs is estimated at $60,000 to $70,000. For each complete refractory replacement, the cost of basic brick is placed at $35,000 to $40,000. With silica brick, cost is about $15,000.

Under present operating conditions, the higher brick-for-brick cost of basic refractories is offset by longer life, less downtime and faster production. But some refractory men wonder about slack periods. They say a falloff in steel operating rates will bring a swing back to silica brink. Trend now is toward hotter, faster production.

Coal Labor:

New pact seen near; miners may get $2 a day raise

Agreement between producers and the United Mine Workers Union on a new soft coal labor contract is virtually closed.

New pact—described as giving miners a $2 a day pay hike in two steps—has been the subject of month-long secret meetings between Edward G. Fox, top industry negotiator, and representatives of the UMW.

Two Stage Raise

It's indicated that contract now being worked out will provide for one increase next month and the other next spring. The 200,000 active soft coal miners would get pay hikes roughly comparable with the $1.20 a day increase of Sept. 1, 1955, and the 80-cent boost of last April, which lifted the basic rate in soft coal mines to $20.25 a day.

Some fringe benefits will also be included in the labor pact. UMW has been pushing for paid holidays for some time, but whether the fringe benefits include that feature is not indicated.

Announcement in Week?

Formal announcement of agreement is expected to come within a week or so. There's speculation that Union President John L. Lewis would make the news public at the opening of the UMW convention.

In the negotiations at Washington, Mr. Fox has been representing the Bituminous Coal Operators Assn., an organization of Northern commercial producers and steel "captive" mine operators who account for half of the nation's soft coal production.

Miners are now working under a so-called "open end" contract that runs indefinitely unless either party gives 60 days termination notice. Lewis might have terminated pact as of Aug. 31 but chose to follow the procedure of recent years and meet with industry representatives to work out an agreement without fanfare.

LABOR

FRINGES: Spread Out And Up

Metalworking companies are laying out more for fringe benefits than ever before . . . Survey shows payment for time not worked is costliest item . . . Pensions next.

◆ WHEN a metalworking company hires an employee today, the worker's wages represent approximately 81 pct of his total cost to the company—the remainder is paid out in fringe benefits.

A survey by the U. S. Chamber of Commerce of 321 metalworking companies reveals that, in terms of dollars per worker per year, fringe benefits in the industry averaged $814 per worker in 1955, or 18.8 pct of total payroll cost. In view of new labor contracts, fringe costs in 1956 will be even higher.

These figures point up that weekly wages and hourly rates are no longer accurate measures of either worker income or the labor costs of doing business.

Going Up

During recent years, pension, profit sharing, and a host of other benefits have substantially increased business costs. Vacations, holidays, rest periods, and other payments for time not worked have given workers increased compensation for each hour actually on the job. They have at the same time increased the employer's cost for each hour of productive labor.

Most expensive of the fringes to metalworking is pay for time not worked, which includes vacations, holidays, sick leave and such things as jury duty and National Guard duty. It cost the companies an average of $262 per worker in 1955.

Second in line was pensions, $212, followed by legally required payments (social security, workmen's compensation), $161.5. Rest periods were charged with $101, and the remainder, $76, to such things as profit sharing, Christmas and special bonuses.

Fringe costs for metalworking companies in 1955 were slightly lower than for industry in general. The annual per worker cost among 1000 companies of all types was $819, or $5.40 higher than that paid by metalworking firms. The non-metalworking companies' fringe payments totalled 20.3 pct of their payrolls.

Overall industry picture shows payments ranging from 13.0 pct for hotels to 30.5 pct for banks, finance and trust companies. Highest payments were made in the North East, followed by the Western, East North Central, and South Eastern regions.

In a majority of industries, fringe payments were higher than average for the largest companies, and lower than average for the smallest companies, but this did not hold true with metalworking. Payments were fairly consistent for all size companies.

The survey estimated that the grand total in fringe payments for all employers amounted to $36 billion. This compares with an estimated $1.5 billion paid out in 1929.

Where Metalworking's Fringe Benefits Go

	Pct. of Payroll
Legally Required Payments	3.7
Pensions	4.9
Rest Periods	2.3
Vacations, Holidays	6.0
Profit Sharing, Bonuses	1.8
TOTAL	18.7

Source: U. S. Chamber of Commerce 1955 survey

EXPANSION

WEST: A New Fairless Works?

U. S. Steel considering integrated mill on the West Coast . . . Land bought at Pittsburg, Calif. . . . Western market exceeds present capacity—*By T. M. Rohan.*

◆ A WEST Coast version of the Fairless Works may be in the making.

Land has been purchased and the market is there for an integrated U. S. Steel mill at Pittsburg, Calif., near San Francisco. Earlier this summer a corporation long-range planning committee visited California to study the possibility of additional expansion there among other things. A corporation spokesman in Pittsburgh, Pa., says the plan is under active consideration with other long-range objectives but is nowhere near the design stage.

The bald fact is the western market for steel is running away from local mills and U. S. Steel is playing an expensive checkerboard game to keep up with it. On most quality products, western mills are supplying less than half the steel used in the area and on total ingot basis less than 65 pct this year, from 71 pct in 1953. West Virginia ships almost as much tinplate to California as the top local producer. And Maryland is a close second as a hot-sheet shipper.

No Pipe Dream

No drop-off is seen in the West's $9 billion annual construction industry. A near-record is seen for containers which take another 18-19 pct of the steel. Freight car building will double last year's program. Ingot production in '56 should hit about 6.75 million net tons or 4 pct over last year. Carryovers into 1957 are a certainty on plate, sheet and tin mill products.

A Western Fairless Works is more than a pipe dream. Witness U. S. Steel's acquisition over two years ago of tidewater property adjacent to its Pittsburg Works. And a high-level "claim jumping" legal hassle with Kaiser Steel over staked-out ore bodies on the fringe of Kaiser's Eagle Mountain mine. And the "campaigning" of the highly-respected Mr. Roach at eastern headquarters. Also there's expensive trans-shipment between integrated Geneva Works and the Pittsburg sheet and tin mill.

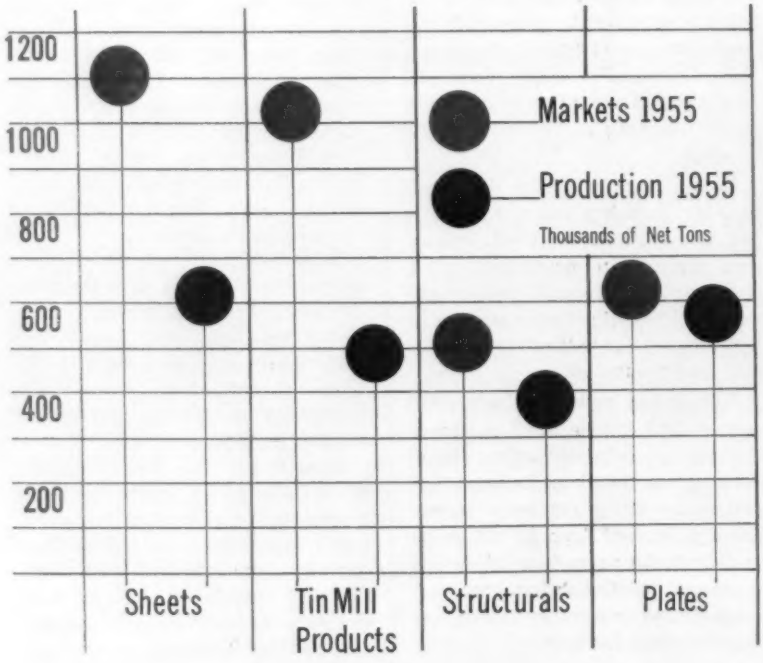
Probable Capacity

Western market growth has been 150 pct of the national market rate. Informed observers see another 30 pct increase to 7.5 or 8 million tons in the next 7 years, compared to about 20 pct expected nationally. Greater population growth, per capita income, and long distances between population centers are expected to spur housing, pipelines, and railroads.

MORE ingots than ever are emerging from soaking pits at Geneva Works, Columbia-Geneva Steel Division.

While the market grows, participation by local mills lags. On sheet and tin mill products, local mills are supplying only 50 pct of the market; on tin mill products alone, 47 pct; on tube, 42 pct. Probably their best showing is on plate, since both the Fontana and Geneva Works were originally built as plate mills for western shipbuilding. They are supplying

Markets Outrun Mill Capacities



85 to 90 pct of the plate market, with steel availability the limiting factor.

The new mill plan for Pittsburg, Calif., would have to make up the present 380,000-ton annual open hearth capacity plus coil requirements for the sheet and tin mill, now provided from Geneva Works. Only after those requirements of about 1 million ingot tons were met would there be an expansion of tonnage available for products to be produced at Pittsburg Works. So it is likely that the new mill would be of 1 million to 2 million tons capacity, utilizing at least one blast furnace.

Based on the property acquisitions, it is possible that plans are being laid so that the plant could be virtually doubled in size at a later date. Fairless Works is rated 2.2 million annual tons.

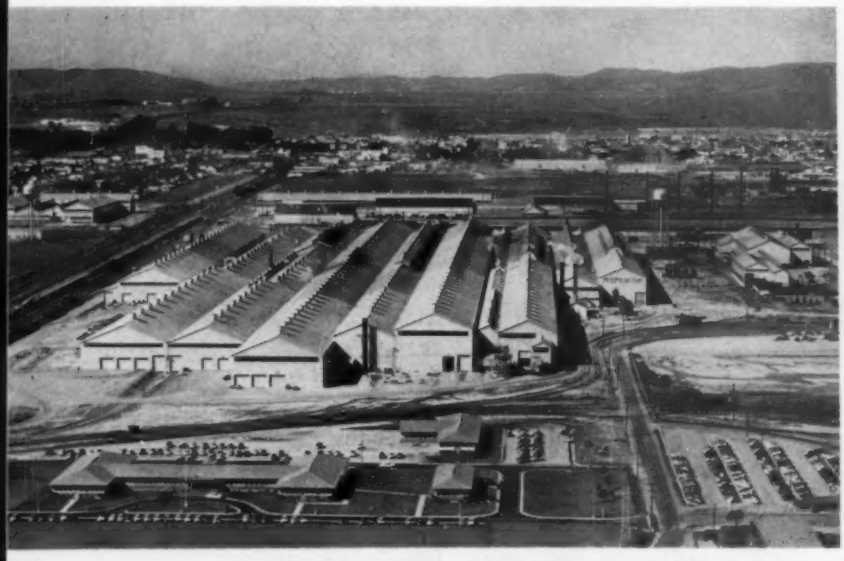
Pittsburg Works already has electrolytic tinning lines and two modern cold reduction mills installed in 1948 and 1952. They have become more or less finishing mills for coils from Geneva, 800 mi. east.

Geneva Works, built in World War II to turn out shipbuilding plate, has been expanded to about its limit and remains the largest western steel mill. Independence from furnishing semi-finished steel for Pittsburg would result in its achieving maximum potential from its latest announced expansion—383,000 annual tons in plate, hot rolled sheet, and structurals over 4 in.

West Coast: Grow, Grow, Grow!

(11 Western States)	1953	1954	1955	1956*
POPULATION	21,800,000	22,400,000	22,900,000	23,500,000
STEEL MARKETS (Net Tons)	6,596,000	5,529,000	6,640,000	6,850,000
INGOT PRODUCTION (Net Tons)	6,670,000	5,360,000	6,492,000	6,750,000
HEAVY CONSTRUCTION AWARDS—(Dollars)	3,403,000,000	3,284,000,000	3,560,000,000	4,000,000,000
AUTO ASSEMBLY (Units)	659,000	526,000	950,000	875,000
HOUSING STARTS (Units)	251,000	291,800	300,000	280,000
METAL CANS (Net Tons)	937,000	920,000	1,107,000	1,075,000
PLATE FOR PIPE (Net Tons)	180,000	170,000	272,000	360,000
MFG. EMPLOY (Avg/Mo.)	1,601,000	1,555,000	1,640,000	1,700,000
TOTAL EMPLOY (Avg/Mo.)	6,552,000	6,463,000	6,752,000	6,900,000

* Estimated



MODERN, expanded plant of Columbia-Geneva Steel Div., U.S. Steel Corp., at Pittsburg, Calif., is a big factor in increased western sheet output.

Most obvious drawbacks to a northern California integrated mill are lack of nearby raw materials — coking coal and large proved ore reserves. Thus a long-haul scheme is inevitable. But the prospect of a long-haul program for ore does not now seem so dismal since eastern mills have shown the way by hauling it from South America and Canada to east coast mills. And Kaiser has demonstrated a coal haul from Utah can be made to work.

Venezuela mines could ship ore to the West, but on a longer haul than to Fairless. Unlike the shallow Delaware, the West has the advantage of deep water docking at the mill. Other substantial available ore reserves are in Peru, Vancouver Island, and possibly Alaska. And modern beneficiation methods for low grade ore are giving mills about 15 pct better blast furnace yields, making use of lower grade ores economically feasible.

Freight Important

Placing the major expansion of U. S. Steel in northern rather than southern California is also significant. Probably about 65 pct of Kaiser's output in southern California is shipped into Los Angeles, only 45 mi. from Fontana.

DEFENSE

TARIFFS: Defense Doctrine Draws Fire

Growing list of industries seeking tariff protection under Trade Agreements Act meets opposition at home and abroad . . . Watch industry is test case in ODM hearings . . . Swiss firms seek economic reprisals.

◆ AMERICAN INDUSTRIES are taking sides against each other in one of the hottest trade issues in recent years—that of "defense essentiality."

Caught in the middle is the Office of Defense Mobilization whose 1954 decision recommending tariff protection for the domestic jeweled watch industry touched off the whole controversy.

Following the ODM recommendation, President Eisenhower proclaimed the defense essentiality doctrine as a part of national policy, and the watch tariff was hiked 50 pct.

Opposition Grows

Briefly, the doctrine states that if an American industry deemed essential to the country's security by ODM is considered threatened or harmed by imports, the President may impose tariff and/or any other protective action to safeguard it. But there is growing feeling that the doctrine is being abused by some industries for commercial advantage.

ODM hearings now in progress in Washington are trying to determine which industries are entitled to protection. Its findings will vitally affect the future of many firms and the course of international trade relations.

Separate hearings by the Boggs Subcommittee of the House Ways and Means Committee ended Sept. 26.

One of the most vocal opponents of the defense essentiality doctrine is the United States Council of the International Chamber of Commerce, which has Thomas J. Watson, Jr., president of International Business Machines Corp., as its chairman. Other officers include representatives from such firms as Standard Oil Co. of New Jersey, General Electric Co., International Harvester Co., and Studebaker-Packard Corp.

Skills Are Vital

Following the tariff increase on jeweled watch movements, at least 10 other industries have put in their bids with ODM for similar protection. They include producers of analytical balances, wool textiles, wool felt, oil, thermometers, wooden boats, fluorspar, twine, clocks and pin-lever watches.

These companies claim restricted imports is the only way our vital industries can be kept ready for war mobilization should an emergency arise. Led by the domestic jeweled watch companies, they maintain that their production skills are vital to national security and must be protected from ruinous foreign competition which can undersell due to lower labor costs.

Recent action by one group of American firms served to put the whole question into new focus. Six large American manufacturers of electrical equipment, claiming that their continued existence is being threatened, filed with the ODM requesting that foreign competition be barred from bidding on federal power contracts.

Economic Reprisals

This is the latest step taken under the defense essentiality ruling. Twice recently, a British turbine producer was lowest bidder on federal power projects.

Growing anti-American feeling reported in Switzerland is directly attributable to the increased watch tariff, according to the U. S. Council of the International Chamber of Commerce. At least two American firms have suffered reprisals, it claims. Dow Chemical and an American machinery company have both lost a large Swiss customer.

Do Import Restrictions Protect Defense Industries?

■ Here are some of the arguments, pro and con, on the defense essentiality doctrine of the Trade Agreements Extension Act of 1955.

FOR

Preserves critical skills and establishments.

Allows vital domestic industries to compete with foreign producers having cost advantage.

Maintains active and continuous research in these industries.

Assures a minimum mobilization base.

AGAINST

It is an inefficient and costly method of protecting vital industries.

Aids firms in the protected industry regardless of whether they need it or not.

By reducing competition, it may reduce the vigor of the industry.

Burden of support rests on the consumer and other industries.

Damages our relations with friendly nations.

Results in economic reprisals by foreign countries.

ATOMIC ENERGY

NUCLEAR MARKETS: How to Crash Them

Atomic research and development alone will reach $1 billion a year for next ten years . . . You can tap the market with your own products and materials . . . Guide posts to atomic market—By *K. W. Bennett.*

◆ METALWORKING executives are taking a long, hard look at a brand new market: atomic energy. If you still feel that Atoms-For-Peace are out of Buck Rogers, it's time for a short course in a spanking new industry that has grown up overnight; buys increasing tonnages of metalworking goods each year, and is just beginning.

About 50 major companies in the United States do prime contract work for the government in atomic development. They, in turn, buy goods and services from at least several hundred subcontracting firms, and the number is mushrooming like the last cloud over Eniwetok.

Atomic development and research will amount, conservatively, to about $1 billion per year for the next ten years. The AEC alone will add about 1000 scientists and engineers to its payroll each year. Private industry, unheard from until about two years ago, has snapped alert and is already hiring at the very least the same number of engineers and scientists yearly, and is zooming upward at a considerably faster rate than the AEC.

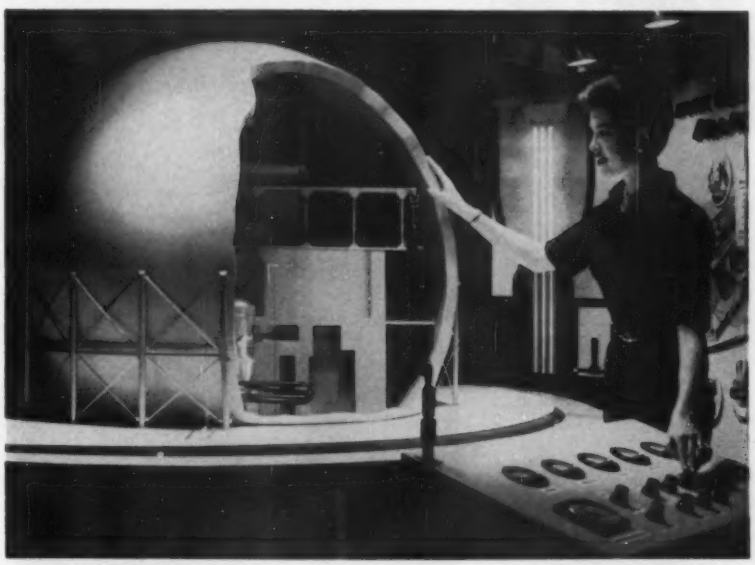
As a rough indication of the rapidity of growth among civilian firms in the atomic field, the AEC has granted 7000 new clearances, many of them amounting to "hunting licenses" to firms seeking to learn from AEC records what products they can manufacture for sale in this market.

Here's How

The president of Molesworth Associates told attendees at the Atomic Industrial Forum at Chicago: "By far the greatest number of companies which have done business in the nuclear field, have done so by merely selling their standard products, materials and services to the government and to industrial concerns engaged in nuclear development . . . Many billions have been spent by the government so far . . . and many billions will be spent in the two decades ahead by both government and industry, billions which will buy products ranging from sand and gravel, through stainless steel vessels, laboratory glassware, pumps, valves and hundreds of other items . . . even paper diapers to absorb radioactive spills."

What to do: first move is obtaining the AEC's booklet "Selling to the AEC" which gives names and addresses of purchasing agents and explains contracting procedures. Second is to contact the AEC Division of Civilian Application. Third, is to contact a competent engineering consultant who has some experience in industrial nuclear work, who will bird-dog the market potential for his client's products. Fourth, if a firm decides to go after nuclear business at present, it had best do so with the same energy it would expend in marketing a new product or establishing a new division. It's worth it. Some estimates figure a gross of "several billions a year by 1965."

The rate of growth of the nuclear industry is difficult to believe. In the past week, Edison Commonwealth announced a new stock issue for the building of six new generating units, plus the biggest nuclear power plant planned thus far: a 180,000 kw plant to cost $45,000,000. It has been estimated that we will have 37 nuclear power plants in operation after the next three years.



REPRODUCTION of GE's dual-cycle boiling water reactor for Consolidated Edison Co.'s Dresden, Ill., nuclear power station shows with lights and water how power develops from reactor core to electric generators.

SPRINGS: Bouncing Toward Sales Gain

Industry's erratic sales pattern won't hinder probable take of $145 million this year . . . Railroad, automotive orders are big factor . . . Flat springs gain favor in both production and product applications.

◆ LIFE IS never dull for makers of heavy springs. One section of the industry came off the ropes late last year and is now enjoying a sales rate 100 pct over 1954. Another spring group had a booming 1955 but is now seeing a big part of its market sag 20 pct.

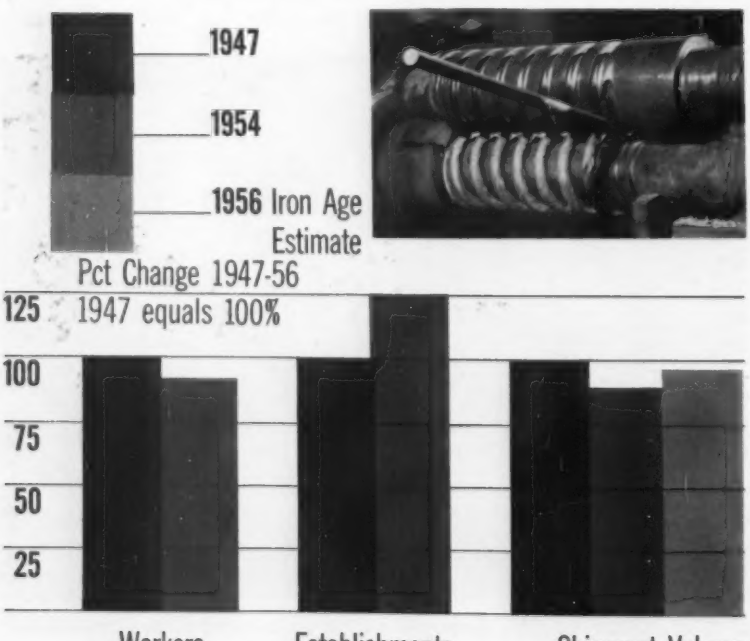
Happily, the ups outweigh the downs. Estimated sales of $145 million this year represent a two-year gain of 12 pct. Things look reasonably bright but producers are keeping their fingers crossed. Shipment volume in 1947 was $92.6 million.

The erratic behavior of the spring market carries over from the transportation industry, which takes three quarters of the country's leaf springs and hot-wound helical springs.

Last summer's freight car program broke too late to boost deliveries for the whole year; they were under 40,000. But this year the program is off the ground and shipments should go over 60,000. What this means to the spring maker is that one 50-ton freight car takes 20 double coil springs, or over 500 lb of spring steel.

Outlook for railroad springs is moderately rosy. The railroads are expected to hold their orders at about 60,000 cars annually for the next five to ten years. This new stability is welcome by spring makers but it does not mean they will be swamped with orders.

Charting Spring Market Trend



They have the capacity today to triple output. In fact, one of the larger producers could probably handle the entire railroad demand by itself. Moreover, snubbing devices have increased rail spring life and cut into the replacement market. Hydraulic shock absorbers, rubber draft gear devices and air springs are current or potential threats to steel coils.

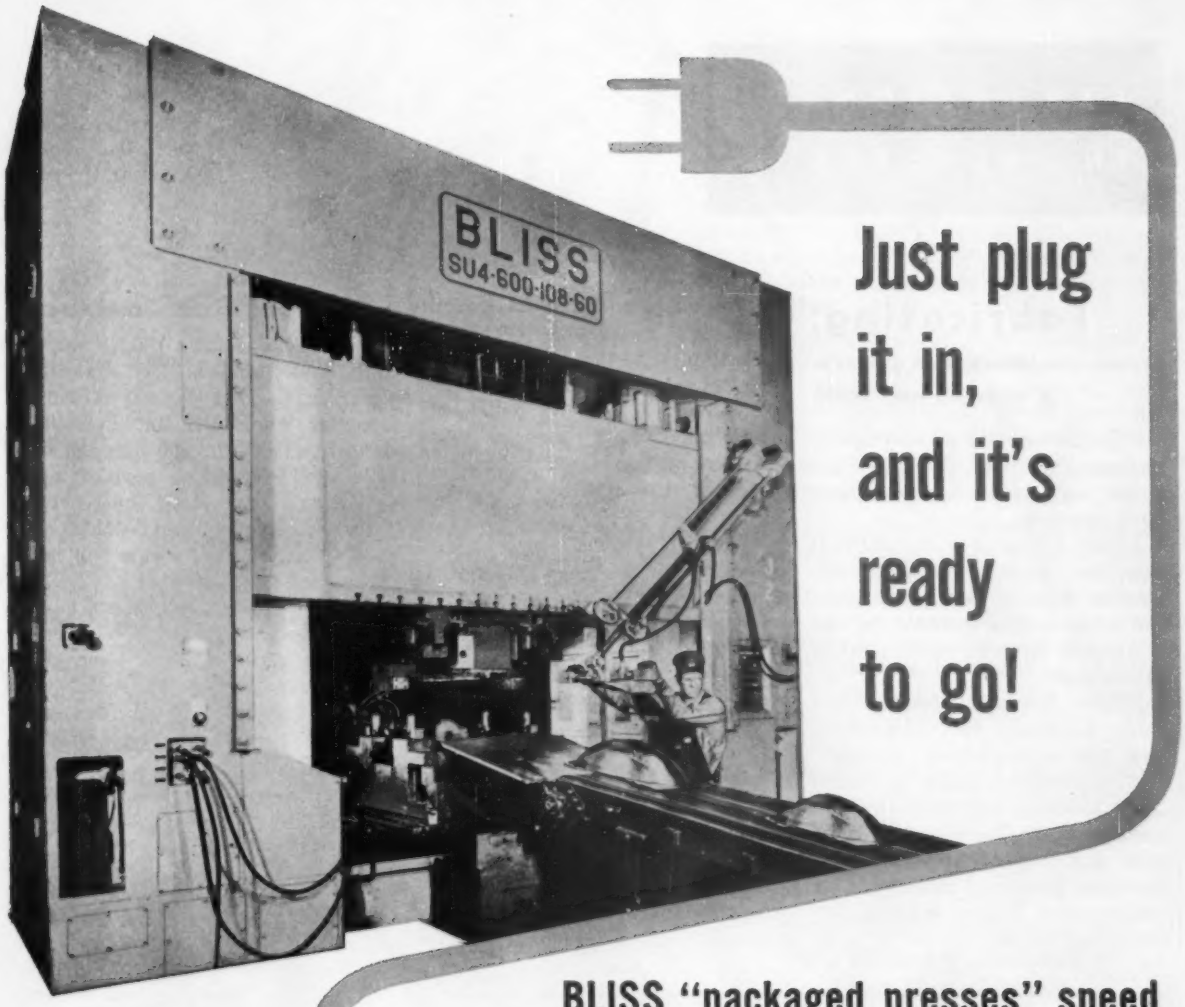
Automotive Use Heavy

In the automotive field, spring producers have the problem of active competition as well as violent sales jumps. Chrysler (which makes its own springs) will use torsion bars instead of coil springs on the front ends of all new models. General Motors has gone to air springs in buses, may offer the same thing on new Cadillacs.

But as a general thing, coil springs are used on the front ends of passenger cars; leaf springs carry both axles of trucks and buses, the rear axles of cars. Over half ($69 million) of all hot formed spring sales came from the automotive leaf type in 1954.

Spring makers don't see anything in sight to weaken their position. Outside of automotive and freight car applications, there are a wide range of spring markets. Hot-wound helical springs are used in earthmoving equipment, crawler tractors, mining tools, presses, conveyor systems, pressure valves, and other expanding industries.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*



Just plug it in, and it's ready to go!

NEW AUTOMATION CONTROL

This new nine-station rotary limit switch will control stops, starts, interlocks, motion, time, or recycles of auxiliary equipment. Each station can be set from 0° to 360°, can be operated either normally-open or normally-closed, and is accurate within less than 1°. Write for Bulletin 33.

BLISS "packaged presses" speed installation and simplify maintenance

Automation created the problem—The dopers, kickers, lifters and other materials handling devices so popular these days brought a maze of wires and pipes in their wake. And aside from looking untidy, they slowed maintenance and proved annoying to crane operators.

"Packaging" solved it—Now, in Bliss' new line of presses, all the pipes and wires, and controls are built into the uprights. Each air and electrical line is tagged—simple to find, simple to fix. Controls are centrally located. The exterior is clean and uncluttered—cranes can move up close to change dies.

Bliss designers have come up with completely new two point and four point presses—both single action and multiple action. Design features include extremely rigid frames, eccentric drives, high speed clutches, extra long connections, motorized adjustments and many others. The entire line of presses is described in a comprehensive 32-page catalog, No. 11-B, just published. Copies for you and your staff are available by writing to E. W. Bliss Company

BLISS
SINCE 1857

is more than a name...it's a guarantee

E. W. BLISS COMPANY, Canton, Ohio

Presses, Rolling Mills, Rolls, Special Machinery

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Midland and Pittsburgh, Pa.; San Jose, Calif.; *Branch Offices in* Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, San Jose, Salem, Toledo, Washington, D. C.; and Toronto, Ontario, Canada; E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France.
Other representatives throughout the world.

EXPANSION IN INDUSTRY

Fabricating:

Armco announces two projects in Midwest and South

Fabricating plant expansion projects totaling $800,000 are under way at two Armco Steel Corp. locations.

Armco Drainage & Metal Products, Inc., is building a $500,000 plant at Atlanta, Ga., and a $300,000 wing is being added to the company's Middletown, O., fabricating plant.

Armco Drainage manufactures steel products for agriculture and the construction industry. The new Atlanta plant will produce gasoline and fuel oil bulk storage tanks, corrugated metal pipe and pipe-arch, farm pond drainage pipe, and miscellaneous construction items. It will primarily serve the Dixie Div.

The plant will also have facilities for converting corrugated metal pipe to the company's new type sewer pipe and for coating and paving pipe with asphalt. Facilities for manufacturing Armco prefabricated steel buildings are expected to be added in the future.

The company's present plant at East Point, Ga., will continue in operation until the new plant is completed, about Jan. 1, 1957.

The Middletown addition consists of a 175-ft extension to Armco's dip galvanizing building, and will have 15,750 sq ft of floor space. The area will be used primarily for loading dipped galvanized products from the Formed Products Dept.

Facilities will include a 10-ton crane, railroad track and truck loading space. Completion is expected by the middle of December.

Private Industry Group Forms Its Own Company for Atomic Energy Research

- **Ten of the nation's large corporations have joined hands in a search for industrial applications of atomic energy.**
- **All are taking part in forming a mutually-owned company, Industrial Laboratories, Inc., and will build a nuclear reactor at Plainsboro, N. J., for research purposes.**
- **Participating are Atlas Powder Co., AMF Atomics, Inc., American Tobacco Co., Continental Can Co., Corning Glass Works, National Distillers Products Corp., National Lead Co., Radio Corp. of America, Socony Mobil Oil Co., and U. S. Rubber. Gen. Walter B. Smith is president of the new firm.**

Freight Car Contracts

The Bessemer, Ala., plant of Pullman-Standard Car Manufacturing Co. has been awarded a contract by Gulf, Mobile & Ohio Railroad Co. for 250 fifty-ton box cars. The order is part of a $5 million rolling stock construction program that will give GM&O 600 new freight cars within the next year.

The railroad has also placed an order for 100 seventy-ton covered hopper cars with the Greenville Steel Car Co., Greenville, Pa.

The Pullman-Standard box cars will be assembled at the Meridian, Miss., shops of GM&O. Cast steel underframes for these cars will be bought from General Steel Castings Corp., St. Louis.

Expansion Briefs

Prentiss Wire Mills, Holyoke, Mass., has been acquired by the Riverside Metal Div., H. K. Porter Co. An expansion program is planned for Prentiss.

Bethlehem Steel Co., awarded a contract to Mesta Machine Co., Pittsburgh, for a 48-in. continuous pickling line for its Sparrows Point, Md., plant. It will handle coils of hot-rolled mild carbon strip up to 44-in. wide.

Republic Steel Corp. is planning a steel barrel plant near Nitro, W. Va., to supply the area's growing chemical industry. The facility will have a capacity of 1 million barrels a year.

Pittsburgh Consolidation Coal Co. and **Standard Oil Co. of Ohio** have formed a jointly-owned company to operate a carbon calcining plant at Cresap, W. Va. The new firm, named Mountaineer Carbon Co., will have an annual capacity of 165,000 tons.

TEMPER, TEMPER!

If Grinding Wheel problems have you fighting mad, why horse around? Switch to CINCINNATI (PD)° WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, if you have grinding problems as tough as trying to tame wild horses, just contact your CINCINNATI Grinding Wheels distributor. He'll be glad to explain how (PD) WHEELS can make life serene once more. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . . (PD) POSITIVE DUPLICATION.

CINCINNATI°
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

° Trade Mark Reg. U.S. Pat. Off.

We just said-

"OUR ENGINEERING SERVICE IS FREE!"

Sometimes you have to be careful how you spring surprises. For instance awhile back one of our good purchasing agent friends called us in to help him lick a tough fastening problem. We licked it all right and naturally he was very grateful.

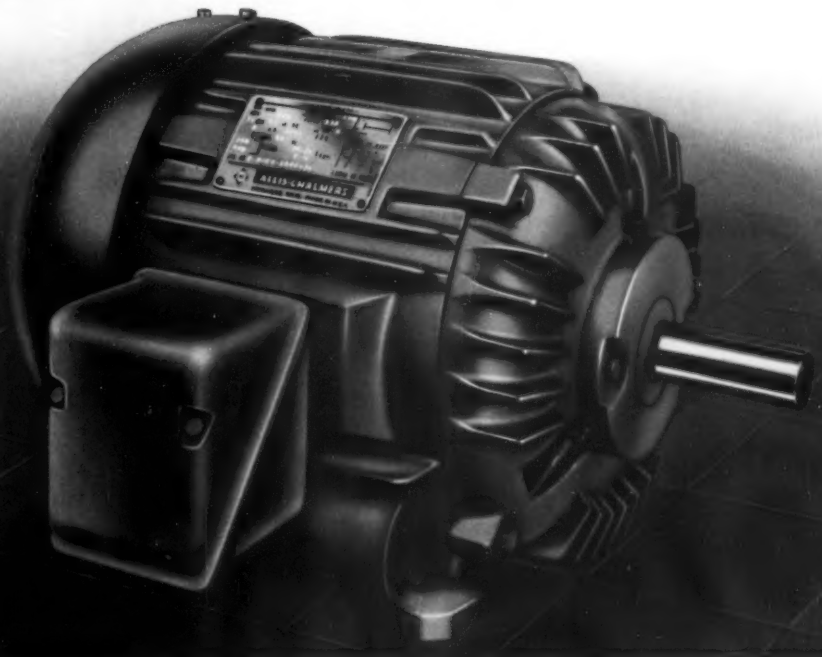
But the excitement started when he asked what he owed. "Nothing", we said. "Lamson & Sessions Engineering Service is *Free!*" Well, that was too much for him—and you can see what happened.

Try "Ell" & "Ess" (that's us) the next time you need help on a fastener problem. But remember that the service is *free*. We don't want to have to revive you, too!

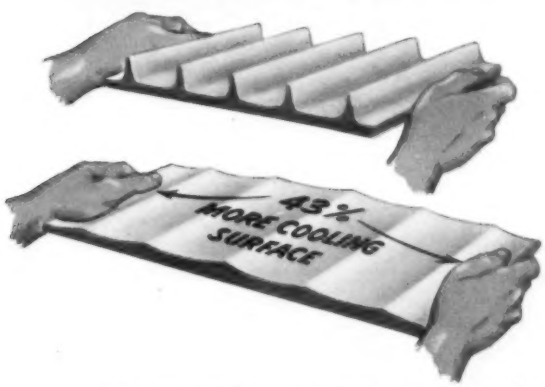
The LAMSON & SESSIONS Co.

1971 West 85th Street • Cleveland 2, Ohio
PLANTS AT CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO

There's MORE *Cooling Surface* with Allis-Chalmers MOTORS



Why Rib-Type Motors Won't Fry



STRETCH OUT RIB DESIGN of Allis-Chalmers motors and see the greater cooling area provided — as much as 43% on many models. Insulation won't fry under normal conditions with deep-rib construction because every rib adds to the heat-dissipating surfaces. The result—moderate overloads can be taken in stride with little fear of burnouts.

As a new machinery component or as replacement, specify Allis-Chalmers. To find out more, contact your nearby A-C district office, distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4882

Two Separate Circuits Mean

Reliable Rectifier Operation

ALLIS-CHALMERS

Mercury Arc Rectifiers

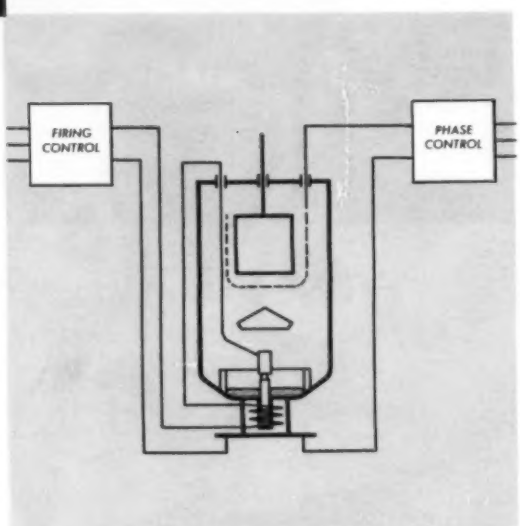
One of four metal-enclosed assemblies in a midwestern installation with a total capacity of 15,000 kw at 620 volts, dc.

1. Firing Circuit

A small dc excitation arc is automatically ignited only once, when the unit is started. It is then maintained on the mercury cathode of each rectifier tube. It offers advantages similar to a pilot light. Since it is far easier to maintain an arc than to start it, this feature reduces the chance of the excitron losing excitation during power supply disturbances.

2. Phase Control Circuit

A separate circuit utilizes the deionizing grid to obtain phase control. Grid-type phase control permits operation in the clean region near the anode where ion density is lowest, instead of on the surface of the cathode mercury pool where there is turbulence and contamination. Reliability of phase control does not depend on the condition of the mercury. This is an exclusive excitron feature.



Only Excitron Rectifiers Provide Separate Circuits

for these two all-important functions. Improved operation results — one function is never sacrificed for the other — you get optimum operation from each.

For Complete Information on rectifier operation, call your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5136

REPORT TO MANAGEMENT

It's Still All Boom in Construction

It's no secret any more that home building isn't going to come close to predictions. At one time, a minimum of 1.2 million home starts this year was considered pessimistic.

It's now predicted that the total for the year will be a lowly 1.15 million new homes. If that had been reliably forecast early this year, it might have brought panic to the building industry.

But even with that comparatively poor record (there were over 1.33 million starts in 1955), the building industry is soaring along to one of its best years.

It's reported by "The Value Line" that of 30 leading building supply companies, 20 recorded sales gains in the first half, 17 improved profits.

It's obvious that the gains came from other sources. Big spending on the part of business and industry, with some help from the new road-building program, has more than stepped in and filled the gap.

The survey indicates that total new construction this year will be at about the same level as 1955, or slightly higher, and that dollar outlays will rise 3 to 4 pct next year.

Where's It All Coming From?

What's more, there doesn't seem to be an slackening in view. "Value Line" calls attention to needed public construction, including institutions, highways and schools.

The survey projects new construction in 1959-61 at 10 pct above the current rate, but the bulk of the increase coming from directions other than housing.

To bolster the sagging home building rate, which is generally blamed on tight money, FHA has reduced down payments from 7 pct to 5 pct on FHA-insured homes of less than $9000. FHA, however, still clings to a 1.2 million home prediction, although this is down from earlier estimate of 1.3 million.

On the industrial side, Securities and Exchange Commission reports business has scheduled fourth-quarter outlays for new plants and equipment at a $38 billion annual rate, up from $36.3 billion in the third quarter. Actual spending in the second quarter was at $34.5 billion rate.

A qualification on new plant spending: Probably latest estimates did not take into consideration effects of the steel strike. This may cut into actual spending, particularly in view of the tightness of structurals, which has already held up much new construction.

How the PA's See It

Purchasing agents, who get an early look at their companies' future plans, indicate one of the best fourth quarters in history for business.

Two-thirds of the purchasing agents, reporting to a National Association of Purchasing Agent's survey, look for improved business in the fourth quarter; 55 pct predict it will be a better fourth quarter than that of 1955.

Optimistic predictions stem from the fact that their companies are stepping up production. Thirty-eight pct report higher production this month, only 9 pct have cut back.

Virtually all are paying more for their commodities, reflecting a strong tendency for most businesses to pass on, rather than absorb, their own higher costs of doing business.

Inventories are stabilizing at a realistic level. Most PA's are satisfied with the overall supply situation. Low inventories usually involve nickel and some steel products.

INDUSTRIAL BRIEFS

Name's Not the Same . . . Defense Materials Service is the new name of the reorganized stockpiling unit of the General Services Administration. Formerly known as the Emergency Procurement Service, the agency will carry out stockpiling directives received from the Office of Defense Mobilization and handle other directly defense-connected activities assigned to GSA.

Sterling in The Market . . . The Yonkers research and laboratory facilities of the Schwarzkopf Development Corp. (formerly American Electro Metal Corp.) have been acquired by Firth Sterling Inc., Pittsburgh. A license agreement in the field of cemented tungsten carbides has been concluded between the two companies. Both are jointly interested in Borolite Corp., Pittsburgh, manufacturer of a full line of products for ultra-high-temperature applications.

Stock for Sale . . . Public sale of 400,000 shares of Acme Steel Co. common stock is underway. Acme will use $9,950,000 from the proceeds of these sales to complete payment of $16,450,000 for its purchase of Newport Steel Corp., Newport, Ky. Balance of proceeds will be added to Acme's working capital. Shareholders of Newport have voted to change the company's name to Newcorp, Inc.

New Hand of Ferro . . . Ferro Corp., Cleveland, has purchased Patterson Machine and Foundry, East Liverpool, O. Patterson, a manufacturer of grinding, mixing and specialized processing equipment for the ceramic, paper, rubber, plastic and chemical industries, will be operated as a subsidiary of Ferro.

Getting Down to Basics . . . Mine Safety Appliances Co. has formed a new wholly-owned subsidiary, MSA Research Corp., to consolidate and expand programs of basic research in the fields of chemistry, physics, and nuclear energy. Organization will handle projects for the parent firm, as well as company's domestic and overseas subsidiary and affiliated companies.

For Safety's Sake . . . Norton Co., Worcester, Mass., has published a booklet designed to summarize its safety program for employees.

Distributor Points . . . Osco Steel Co., Cleveland, has been appointed a general line industrial distributor for Kaiser Aluminum products. Firm, which now handles all types of carbon and alloy steels, will carry a full line of sheet, rod, bar and wire, and extruded shapes.

A. M. LUNTZ, president of Luntz Iron & Steel Co., received National Human Relations Award of National Conference of Christians and Jews.

Lamp of Learning . . . International Nickel Co., Inc., has announced educational grants totaling $1,000,000 as part of its program to aid higher education in the U. S. Some $400,000 of the grants are for the current 1956-57 academic year, with approximately 85 universities and colleges represented. Remaining $600,000 will be applied to fellowships and scholarships for award during the following four years. Forty-seven of the scholarships will cover instruction in engineering, with preference to the fields of mining, geology and metallurgy, in order to encourage students to choose these fields.

More Traffic on Old Miss. . . . Kaiser Aluminum & Chemical Corp. has established a marine traffic operating office at Baton Rouge, La. Office has been set up to coordinate the company's shipping activities in the Mississippi River area. Kaiser ships bauxite ore from Jamaica to a plant at Baton Rouge for conversion into alumina. Firm is currently building another alumina plant on the Mississippi, a $70 million facility at Gramercy, La.

At Your Service . . . Carpenter Steel Co., Reading, has opened a new mill-branch warehouse in Buffalo to service users of tool, alloy and stainless steels in western and central New York, and northern Pennsylvania.

Mountain Stock . . . Airborne Instruments Laboratory, Inc., Mineola, N. Y., manufacturer of precision gaging equipment, has acquired the Mountain Systems, Inc., Thornwood, N. Y. Mountain Systems will be operated as a separate and wholly owned affiliate of Airborne.

'dag' dispersions . . . *a touch does so much!*

"Sticky" conveyor problem solved by colloidal graphite lubrication

For a number of years, Whitehall Pharmacal Company, nationally known pharmaceutical manufacturer in Elkhart, Indiana, had lubrication problems with the bucket conveyor to its coal-storage elevator. Pin wear was excessive, due to abrasive coal dust and the corrosive effects of moisture . . . until they tried lubrication with a **'dag'** dispersion of colloidal graphite in mineral spirits.

Diluted 1:7 with mineral spirits, **'dag'** dispersion No. 2404 is now sprayed on the conveyor links, as shown in the photograph, at two-week intervals. The compressed-air jet carrying the dispersion blows away accumulated dirt . . . lets the volatile carrier deposit a microscopic film of graphite around the pin and link. The resulting *dry lubricating film* is exceptionally durable, provides effective lubricating action, and inhibits corrosion. Whitehall reports that maintenance expense for the conveyor has been drastically cut and down-time all but eliminated.

'dag' dispersions are ideal for conveyor lubrication since they resist abrasion, provide lubrication under extreme pressures, and are not affected by high temperatures. They are suitable for application by automatic oilers and mist lubricators.

Write for more information, contained in Acheson Bulletin 423.

100th Anniversary

1891—SILICON CARBIDE
1896—SYNTHETIC GRAPHITE
1906—COLLOIDAL GRAPHITE

ACHESON COLLOIDS COMPANY
PORT HURON, MICHIGAN
. . . also Acheson Colloids Ltd., London, England

ACHESON COLLOIDAL DISPERSIONS:
Graphite • Molybdenum Disulfide • Zinc Oxide • Mica and other solids

'dag' is a registered trademark of Acheson Industries, Inc.

ACHESON COLLOIDS COMPANY
Port Huron, Michigan, Dept. D-10

Yes, I want to get your free bulletin describing **'dag'** Dispersions for High-Temperature Lubrication.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

Ford Guns For '57 Lead Over Chevvy

Early start, new styling and engineering changes seen as real advantage for Ford . . . General increase in car prices will favor all low price automakers . . . Chevvy has capacity edge—*By T. L. Carry.*

◆ THE NATION'S TWO leading car producers, Ford and Chevrolet, are all set for a slam bang sales battle this year and the rallying cries can be heard all over the country as both sides line up their forces.

Ford, by introducing its new cars this week, has a slight edge over Chevrolet which won't have any on the street before the middle of the month.

The new Ford line includes two sizes of cars—one with a 118 in. wheelbase and the other with a 116 in. wheelbase. The new cars have new bodies, new wheels, a beefed-up frame and a suspension that has been rearranged for smoother riding. In addition, engine hp has been increased along with the compression ratios. The 1957 engines are rated from 144 hp for the 6 cylinder to 245 for the V-8.

On The Threshold . . . Henry Ford II, company president, says that this new model marks the beginning of a new era for Ford. "This is the year we've been aiming for," Mr. Ford claims. He makes no secret of the fact that the company has a brand new product and is in a better position than ever before to beat Chevrolet.

Chevrolet is not unaware of Mr. Ford's remarks and has taken the occasion to utter a few well chosen words on the subject.

E. N. Cole, division manager, says in a supposedly humorous vein "You have to get up off the canvas before you can start swinging."

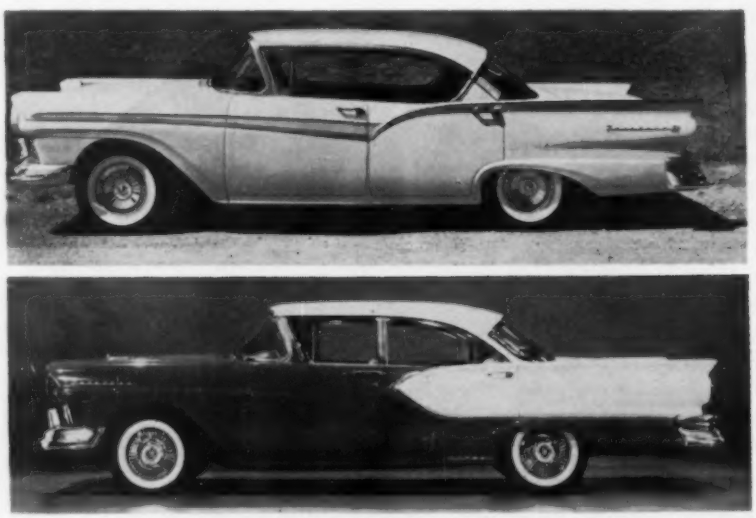
Mr. Cole is referring to the model year just ended when Chevrolet beat Ford so badly that it wasn't even considered a race. In addition, the GM division has been consistently successful in its efforts to top Ford for the past 21 years.

That's a record that is hard to beat and Chevrolet has no intention of giving it up. The division is not cocky about its position in the industry but it is prepared to meet all comers.

Off The Cuff . . . The division has a few things up its sleeve for 1957. True, there is not as much of a body change as was made at Ford, but there are some engineering innovations that are likely to give Ford a few headaches. One of these is a fuel injection system which will be standard equipment on the 1957 Corvette and optional on all other models. There are others that won't be announced until the cars are introduced but they are equally as startling as the fuel injection.

Neither side is concerned over an increase in prices. Ford says that the average retail price of its cars will go up about $70. Chevrolet won't talk about costs right now but the division is confident that the increase won't affect their sales.

Here's the reasoning behind the theory: Inasmuch as all car prices will go up this year, people who might have been considering a more costly car will be more inclined to turn to the low priced



THE 1957 FORD line includes 19 body styles. Newest addition is the four-door Victoria (top), one of the Fairlane 500 series. Fairlane sedan (below) has hardtop styling, is longer and lower.

Thus, V.T.L. operator Joseph Walent at Crosby Steam Gage and Valve Co. summarizes his comments on their new 26" Bullard Cut Master, Model 75.

"With the movable Pendant Control I can work from the most advantageous position. You'd be surprised how much easier the Pendant Control makes it for me. It increases my production too, to have all the controls in one spot — no running back and forth from one control to another." This feature of the new line of Bullard Cut Master, Model 75 is only one of many reasons why you should have them in your plant.

Why not get the full story — ask for a catalog by calling your nearest Bullard Sales Office, Distributor or write

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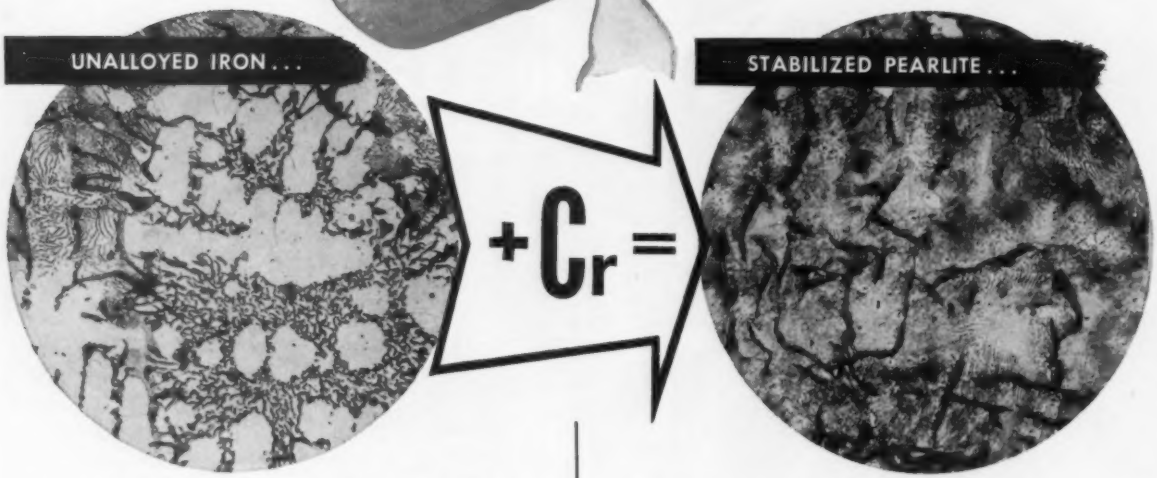

Figure 1. This micrograph (nital etch x 250) shows a critical section in the bore of an automotive cylinder. The section is made of unalloyed iron containing 3.24 per cent carbon and 2.12 per cent silicon. Note the large white areas of ferrite which make the cylinder soft and subject to failure by wear and scuffing.

Figure 2. Here is the same location in a similar cylinder made of chromium iron. The iron contained 3.24 per cent carbon, 2.45 per cent silicon, and 0.51 per cent chromium. You can see that the addition of chromium has produced a fine-grained pearlitic structure which is resistant to wear and heat.

Today, high-quality iron castings must meet specifications calling for specific microstructures, especially in critical sections where failure is most likely to occur. For the foundryman who must guarantee a pearlitic structure in castings subject to wear, heat, and abrasion, chromium is an indispensable alloying element.

Unalloyed iron may show wide variations in microstructure in the same casting, especially in sections subject to rapid cooling. These sections will usually contain large quantities of ferrite, as shown in Fig. 1. Addition of as little as 0.25 to 0.50 per cent chromium, however, will prevent the formation of ferrite, giving a stable pearlitic structure, as shown in Fig. 2. These stabilized chromium irons are widely-used in castings for heavy-duty automotive engines.

ELECTROMET produces a complete line of chromium alloys for use in structure control of cast iron. For ladle additions, ELECTROMET makes several grades of ferrochrome and ferrosilicon-chrome. When chromium is added to the cupola, foundrymen may use "EM" chromium briquets. For complete information about these chromium alloys, as well as technical assistance in their use, contact your nearest ELECTROMET office.

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
SEPT. 29, 1956	40,413	14,032
SEPT. 22, 1956	37,392	15,326
OCT. 1, 1955	120,665	23,869
SEPT. 24, 1955	127,038	24,766

*Estimated. Source: *Ward's Reports*

field. Both Ford and Chevrolet fit nearly into this category.

Closing The Gap . . . As far as the credit situation is concerned, W. E. Fish, Chevrolet general sales manager, says there is nothing wrong with the present policies that a good, hard selling job can't overcome.

The time has probably gone when Chevrolet will be able to beat Ford as badly as it did in 1956. Ford is out for blood and the result will be much closer than it was in 1954.

But it still appears that Chevrolet has the edge because of its larger productive capacity. Mr. Cole believes that his division will have another 2 million-vehicle year similar to 1955. Ford says that it expects its sales to increase at least 10 pct over 1956 and the company is planning on overtime in its factories to meet its goal.

The consumer stands the best chance to gain from this fight. As long as the competition between the two automakers is so fierce both products will be the best that either company can produce.

Safety Law Weighed

Current reports in Detroit are that Congress may soon make some kind of a move in forcing auto producers to make certain safety devices on their cars standard instead of optional equipment.

Rep. Roberts, chairman of a House Committee investigating highway safety, says that the group is convinced that cars can be made safer than they are today.

If and when legislation is introduced to make cars safer, it would no doubt include some reference to seat belts and padded instrument panels. So far, these are the two major items that manufacturers have offered on their cars.

In the first place, they would increase the price of the car and producers are already wondering how the public is going to react to the higher prices next year.

Secondly, even if motorists bought cars with seat belts, what are the chances of them being used all the time? Mr. Roberts is likely to find that he has a bull by the tail should his committee decide to introduce such legislation.

Radiators:

Chrysler speeds up aluminum corrosion tests.

Chrysler Corp. is using tiny aluminum discs and spinning them at extremely high speeds as part of its research on corrosion of aluminum radiators.

The discs, which Chrysler calls flying saucers, are immersed in various chemical solutions and turned at speeds up to 12,000 rpm. The tests are part of Chrysler's work on aluminum radiators which has extended over the last 10 years.

This method of testing speeds up what is ordinarily a very slow process and Chrysler claims that years of research can be cut to weeks.

AUTOMOTIVE NEWS

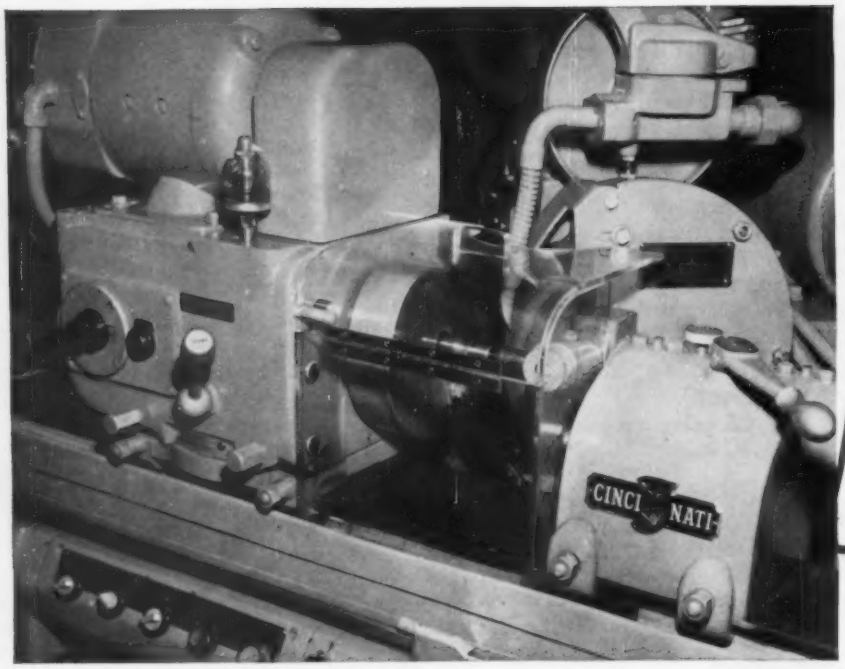
Dr. Sumner B. Twiss, assistant chief engineer, chemical research, says that a major deterrent to the use of aluminum radiators has been the lack of definite information on its corrosion resistance to water and other coolants. Dr. Twiss says that so many different conditions have to be tested and evaluated that Chrysler would have been running tests for years to come if it had not developed its flying saucer method.

Normally, tests of chemicals in radiators involve many months of road tests. The Chrysler method can determine the corrosion resistance of a chemical in less than 500 hrs.

The amount of corrosion is determined by weighing the aluminum disc and observing the pitting depth after the test. Equipment used includes a glass flask which contains the coolant and a high speed stirring rod which holds and spins the disc. The 12,000 rpm speed is ten times greater than any speed attempted previously.

THE BULL OF THE WOODS — **By J. R. Williams**

WE WAS JUST HAVIN' A LITTLE FRIENDLY KIND OF BOXIN' BOUT, JUST SLAPPIN' LIKE, AND DICK DUCKED AND HIS HEAD HIT TH' STEEL BENCH AN' HE'S OUT COLD! GIT SOME WATER!
I GUESS THAT'S WHY THEY DON'T HAVE MANY MOVIES ABOUT SHOPS-- THEY CAN'T HAVE BIG FIGHTS THAT BUST UP ALL TH' FURNITURE IN TH' PLACE!
NO, YOU DON'T BUST TH' FURNITURE-- IT BUSTS YOU! FIGHTS LIKE THEM WOULD END WITH ONE PUNCH AN' ONE BUMP!
NO PLACE FOR HEROES
10-9 J.R.WILLIAMS
T.M. Reg. U.S. Pat. Off.



CINCINNATI FILMATIC 10" UNIVERSAL GRINDER set up to grind simultaneously diameter and shoulder of titanium trip dogs. Wheel runs at 5000 fpm for these titanium parts.

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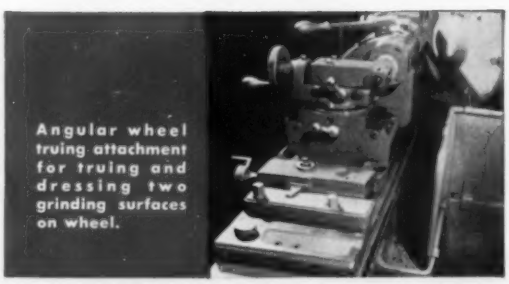

Angular wheel truing attachment for truing and dressing two grinding surfaces on wheel.

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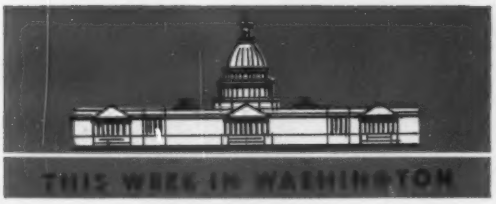

Money Squeeze Hasn't Hurt Spending

Neither industrial expansion or consumer purchasing slows down appreciably . . . Planning for new markets still bullish . . . Consumer sales hold up . . . Higher cost of loans often added to prices—By G. H. Baker.

◆ GOVERNMENT'S money managers are finding that the higher cost of money is not putting any big dent in buying plans. Neither industrial expansion schedules nor individual consumer spending has slowed down appreciably as a result of the money squeeze recently triggered by the Federal Reserve Board.

Optimism — both at the corporation board level and among families—is the answer.

Thinking is Big . . . Many business men, counting on another four years of a friendly political administration in Washington, are thinking big in estimating their future markets and plant and equipment needed to supply them.

Consumer sales are holding up surprisingly well. It is too early to note any trend in the sale of 1957 cars, but retail and wholesale trade shows plenty of zip. Department store sales are running well ahead of last year, although the emphasis is shifting slightly from hard to soft goods.

Businessmen, particularly small firms, are finding that bank loans cost more, but they are experiencing little difficulty in passing on higher cost to their customers. There is some grumbling among the customers over this, but surprisingly few reports of cancelled sales.

Tanker Crash Plan

A "crash" program for construction of sea-going tankers is in the offing. Defense officials, after conferring with oil industry representatives, say the free world's present tanker-fleet — including reserves — doesn't add up to enough capacity to keep Western Europe supplied with oil if the ships are denied the Suez Canal. If shipping between the Middle East and Western Europe has to move around the Cape of Good Hope, many more tankers will be needed to speed up oil movement.

Under present tentative plans now being studied here, U. S. shipyards would share in the tanker construction program with European yards.

It all depends upon what kind of a deal for continued use of the Suez Canal can be worked out with President Nasser of Egypt. Nasser, it's believed, will finally agree to some kind of "user plan" for canal customers if he thinks the free world customers are serious in their intent to boycott the Suez and schedule long voyages around the tip of Africa. He can't risk total loss of revenue.

Meanwhile, shipyard owners on both sides of the Atlantic are oiling long idle machinery in anticipation of big new orders.

Senate Readies Labor Racket Probes

◆ A SENATE investigating subcommittee is now conducting the initial spadework in what could turn into a major congressional probe of organized racketeering in labor unions.

Agents of the committee have spent the last two weeks in New York laying the groundwork for the first phase of what the subcommittee, headed by Sen. John L. McClellan, D., Ark., believes will turn into a full-scale investigation of all racketeering in labor-management.

Target No. 1 . . . First target of the congressional investigators are the various Teamster union locals in and around New York — scene of the blinding of labor columnist Victor Riesel, attributed to gangsters with close union ties. This particular case is also under investigation by the FBI and state authorities.

Subcommittee hopes to use this case as a springboard to uncover, and put the public spotlight on, gangster influences in other unions. They believe, as do independent crime experts, that gangsters have for years been systematically attempting to move into labor unions — with varying degrees of success — as the only source of huge chunks of cash since the end of prohibition.

Time is Needed . . . Groundwork on the labor racketeering probe will take some time and may be impossible to work it out the way the subcommittee wants.

Investigators want to conduct minute studies of union books and records — using at least one former FBI agent in conducting the study.

It will be at least the first of the year, maybe months later, before the subcommittee will be ready to start any public hearings on the teamster cases.

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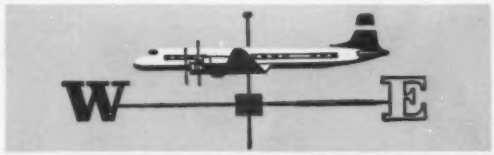

WEST COAST REPORT

How Should Authority Be Delegated?

Study shows middle management group doesn't get enough power to make decisions . . . Broadening responsibility isn't quite as easy as it looks on paper . . . Long chains of command hard to avoid—By *R. R. Kay.*

◆ "WE'VE GOT the administrative setup for the boss to delegate more authority," says a vice-president of a manufacturing company. "But," he wails, "he just can't bring himself to loosen his grip on the reins."

Well, if that's the case in your firm, you're not alone. A thirty-company study made here shows that middle management executives in fast-growing companies are seldom given enough authority. And it's especially true if a firm grew by leaps and bounds since World War II.

Decisions, Decisions . . . All the companies surveyed tried to broaden management responsibility by setting up new departments, decentralizing, and opening branch plants. Although they hired new middle level executives, only 10 out of 29 companies feel that their top management is doing less operating detail now than in 1947. Reason: As a company expands, there's a big lag in taking on more managers and giving them power to make decisions.

In a fast-growing company the "communications" gap between top management and the lower echelons widens swiftly. Since 1947, many of the companies studied added one or more management levels to their administrative setup. Also, they've jumped use of committees by 72 pct.

The Lengthening Chain . . . Eight of the thirty companies have a strict policy — keep the chain of command short. It looks easy on paper, but to make it work is something else again. Only four companies say their top brass makes good use of middle management.

Sad note: Any firm which is expanding or diversifying had better face the business facts of life. It's inevitable that they're in for a long administrative chain of command. And a more complex setup. That's what the study shows. So says Dr. James McNulty of University of California at Los Angeles' Graduate School of Business Administration.

Western Growth

California factory employment is at a postwar high of 1,221,000 workers. This is 61,500 more than the previous postwar record of September, 1955. And it's only 30,000 less than the all-time high of August 1943.

Manufacturing industries took on 64,400 workers in July and August. Aircraft showed sizeable gains. Employment rose for the 14th straight month to a new postwar high of 266,200 workers.

But on the downside is auto assembly, showing a loss of 6,700 from August 1955.

FUNCTIONAL MOCKUP of main landing gear for new Electra project airliner is checked by Lockheed engineers. Study of such mockups shortened plane's development time, helped it enter fabrication stage sixteen months after original announcement. Initial flight is scheduled for January, 1958.

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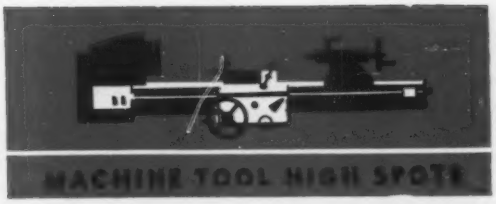


Orders and Shipments Spurted in August

Sales were $87.5 million, shipments $75.1 million . . . Order backlog is now 7.7 months as compared with British total of about 15 months . . . Less American orders placed for English equipment—By E. J. Egan, Jr.

◆ APPARENTLY some of the nation's machine tool builders cut their vacations short and came back to "mind the store" in August. Whatever the reason was, new orders and shipments for metal cutting machines both rose somewhat sharply compared to June and July figures.

Net new orders, for example, which were clocked at $61.9 million in June and July both, perked up to $87.5 million in August. And shipments, which had dawdled along (comparatively speaking) at levels of $69.4 million and $66.2 million in June and July respectively, climbed to $75.1 million in August.

Meanwhile in England . . . Net effect of August business, according to National Machine Tool Builders' Assn., is to put the industry's backlog at 7.7 months.

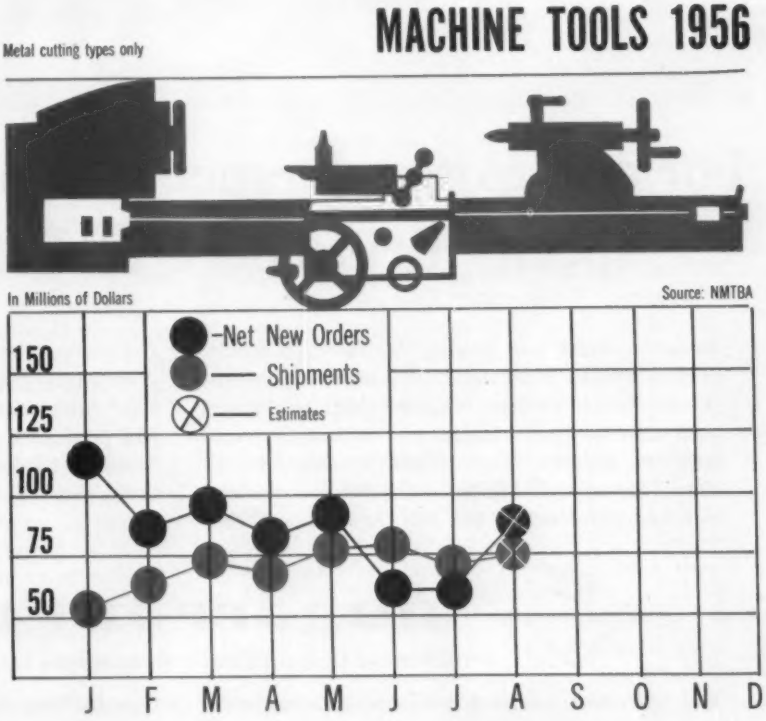
Comparable figures on the British machine tool situation aren't quite as up to date as the foregoing, but do indicate that, as of the end of May, the average British builder had a 15-month backlog of unfilled orders.

This extra-long delivery picture might account for the recent drought in new orders for made-in-England equipment. Incoming business in May was 12 pct below the average for the final 1955 quarter. Moreover, new orders in March, April and May this year were below reported totals for the same months of 1955.

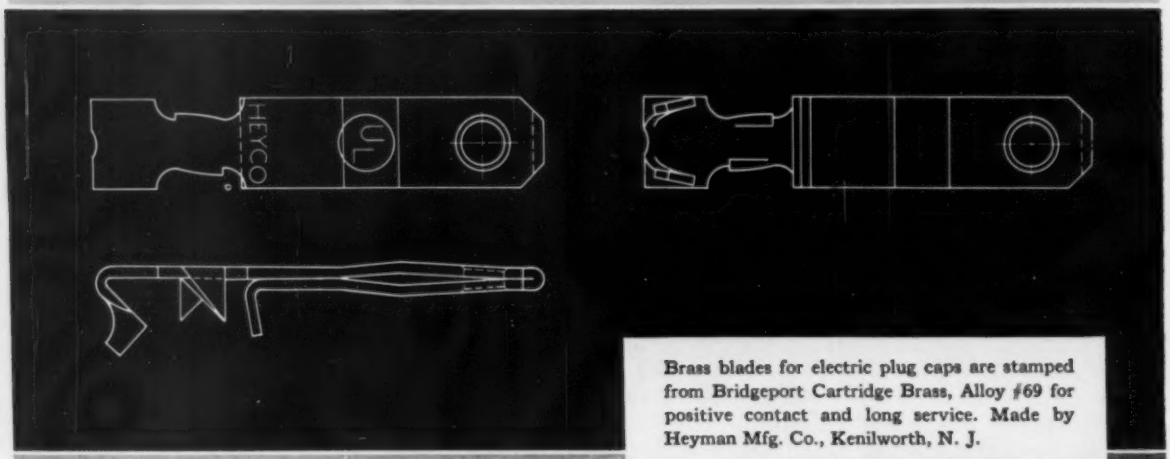
Despite the British industry's heavy backlog, deliveries between January and May this year slid off 2.5 pct compared to the same 1955 period. Domestic customers seem to have suffered most in this situation, because export deliveries actually showed a slight increase from January through May.

American Tools Popular . . . This slow-down on shipments to their own countrymen can't be very helpful if British builders want to increase domestic sales as they surely must. They're already up against a rough situation in that many United Kingdom metalworking firms seem to prefer imported U. S. and West German equipment. For example, imports of American-built machine tools doubled in the first seven months of this year, compared to 1955. And West German builders shipped 78 pct more machines to Britain in the January-July 1956 period than they did over a similar span last year.

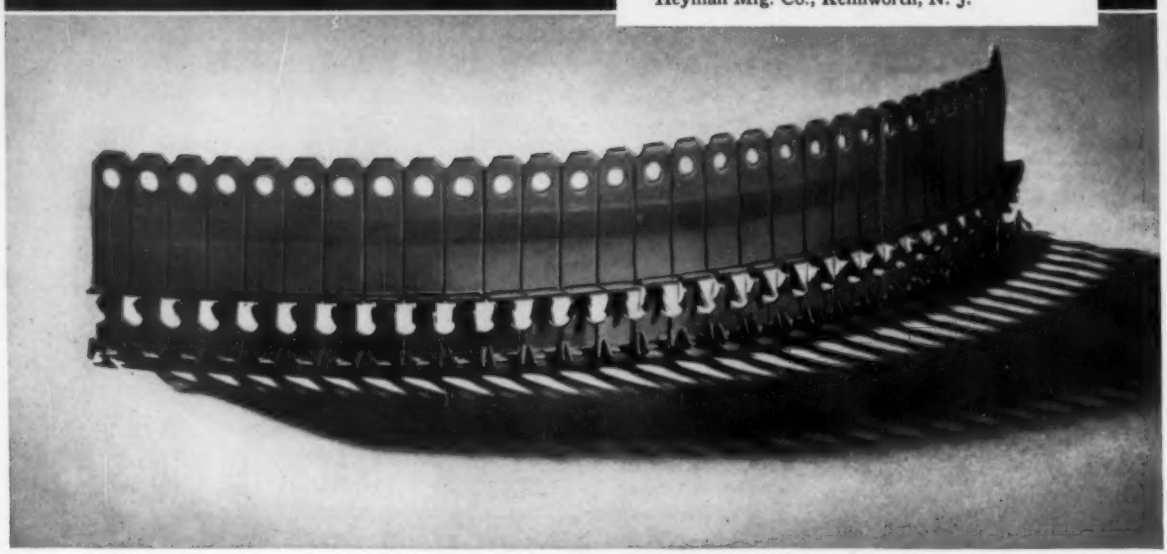
On to Cincinnati . . . Eighth Annual Conference on Machine Tools, sponsored by American Institute of Electrical Engineers, will be held October 22 through 24 at Hotel Sheraton-Gibson, Cincinnati. Program highlights include sessions on: new developments in static control elements, latest revisions of electrical standards.



Matching metal to job with Bridgeport alloys



Brass blades for electric plug caps are stamped from Bridgeport Cartridge Brass, Alloy #69 for positive contact and long service. Made by Heyman Mfg. Co., Kenilworth, N. J.



For fast, close-tolerance stamping and forming specify Bridgeport HIGH I.Q.* Strip

Stamping brass plug blades like these on special presses with multiple station dies calls for the right combination of methods and material. The material used must have exact temper and ductility for clean cuts and accurate forming and bending through 180°. That's why Bridgeport Alloy #69 was specified —it was *matched* to the job, for manufacturing requirements as well as for the finished product.

Stamped or machined—there's a Bridgeport High I.Q.* Alloy that will help you cut production costs and produce a better product. Call your nearest Bridgeport Sales Office today. They'll give you the metal that's *job-matched* to your requirements.

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The Iron Age SALUTES

Stanley R. Cope Founder of Acme School of Die Design Engineering, he has trained 2500 technicians, helped many metal stamping firms solve technical problems. He received the Pressed Metal Institute's 1956 Presteel Award.

"If an industry wants to progress it has to share its technical knowledge."

On this premise, Stanley R. Cope left a good job in 1935 to establish the Acme School of Die Design Engineering in South Bend, Ind. As chief die design engineer for Bendix Products Div., Bendix Aviation Corp., he had so much trouble getting trained men, he saw real need for a specialized school. In 20 years, Mr. Cope has trained 2500 die design students, founded schools in six more cities.

Besides training technicians, he has conducted a number of research projects for improving metal stamping methods; served as a consultant to firms the world over; makes an annual 25,000-mile lecture tour during which, to date, he has talked to about 30,000 tool and die men; and written two books which are standard reference source in the tool and die field.

Because Mr. Cope "probably has done more than any other individual to establish high technical standards for the stamping industry," the Pressed Metal Institute, on Oct. 3, presented him with the Presteel Award for 1956.

Born in Toledo, O., 49 years ago, he won an award as the town's top vocational school graduate. While working summers in forging and stamping shops, he became intrigued with the "miracle of the punch press." After a lot of trying, he managed to get an apprenticeship in a diemaking shop.

"In the old days, you almost had to win a medal to break into the clique," Mr. Cope says. "In order to get to the top you had to spend many years at the trade and befriend people who knew the secrets." From his own experience, he knew how tough it was for a young man to get started in diemaking. But by the time he got to the top, he saw how ruinous technical secrecy was to industry—and he did something constructive about it.

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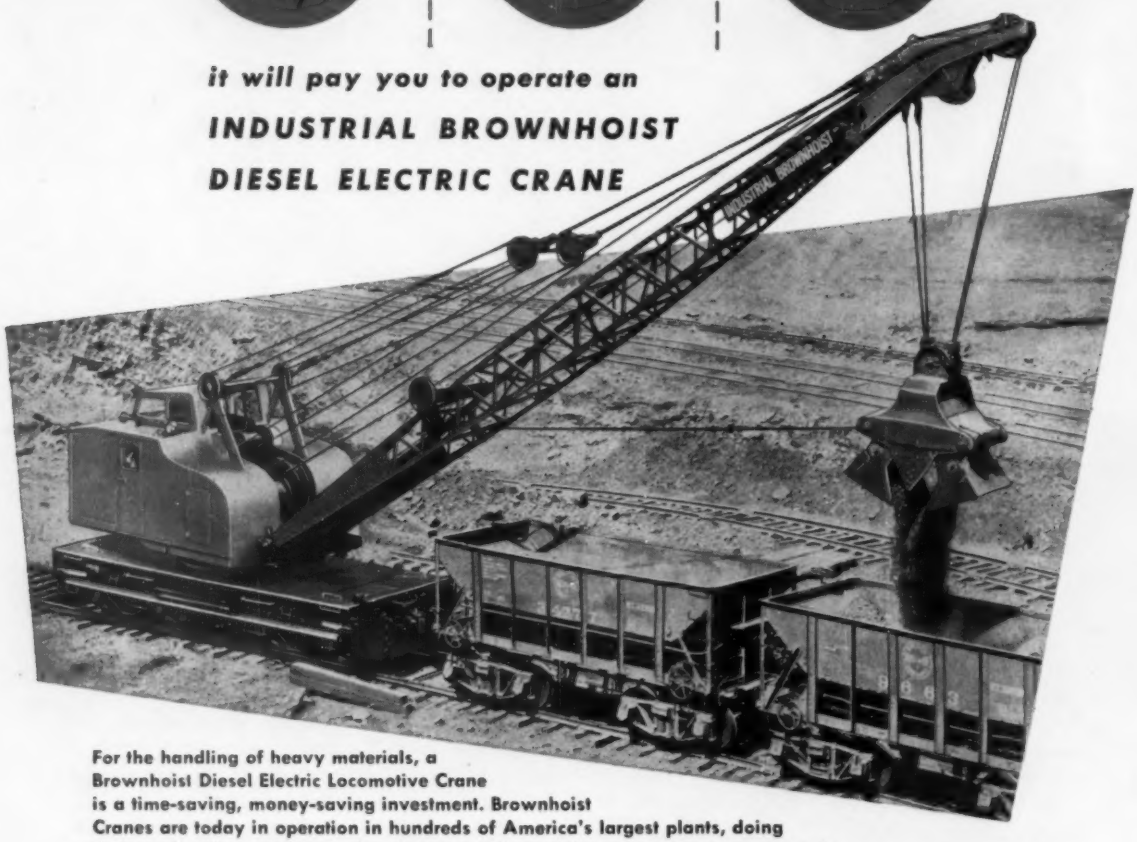

For the handling of heavy materials, a Brownhoist Diesel Electric Locomotive Crane is a time-saving, money-saving investment. Brownhoist Cranes are today in operation in hundreds of America's largest plants, doing their work with a minimum of maintenance. Brownhoist cranes can save money by doubling as switch engines. They haul up to 7 or 8 loaded cars on straight and level track. All Brownhoist machines possess the famous Straight Line Power Train, which means you get the smoothest and most efficient crane operation. Brownhoist cranes give your operator greater visibility through the patented Monitor Type Cab and Clear Vision Boom, allowing him to work faster and with more safety. Electric swing available at extra cost on all models. Industrial Brownhoist Diesel Electric Locomotive Cranes are available in capacities from 25 to 100 tons. Write for Catalog No. 548.

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The Iron Age INTRODUCES

Howard J. Daly, elected vice president and general manager, Electro-Chemical Div., **Norton Co.,** Worcester, Mass.; **William G. Fallon, Jr.,** named general manager, Refractories Div.

W. W. Gilmore, elected vice president, **Minneapolis-Honeywell Regulator Co.**

James P. Malmstrom, elected vice president, **United Aircraft Products, Inc.,** Dayton, O.

H. L. Schrock, Jr., named vice president and general manager, Ball and Bearing Div., **Hoover Ball and Bearing Co.,** Ann Arbor, Mich.

Carter L. Redd, elected commercial vice president, Southeastern district, **General Electric Co.,** Atlanta.

John F. Daley, elected director, vice president, and member, Executive Committee, **E. I. du Pont de Nemours and Co., Inc.,** Wilmington, Del.; **Samuel G. Baker,** named general manager, Organic Chemicals Dept.; **John M. Clark,** named general manager.

Howard B. Johnson, named executive vice president, **Atlantic Steel Co.,** Atlanta.

Charles G. Tournay, named asst. executive vice president, **National Steel Corp.,** Pittsburgh.

Paul W. Pheneger, named administrative vice president, **The Pollak Steel Co.,** Cincinnati.

George V. Kieffer, named director, fleet section, **General Motors,** Detroit.

William M. Fittge, appointed service superintendent, service section, **Allis-Chalmers Industries Group.**

George F. Young, named superintendent, power transformer and heavy tank fabrication, Power Transformer Dept., **General Electric Co.,** Pittsfield, Mass.

Robert M. Estes, appointed counsel, Electronic Components Div., **General Electric Co.,** Schenectady, N. Y.

F. J. Purdy, named sales manager, Welding Dept., **Westinghouse Electric Corp.,** Buffalo, N. Y.; **A. J. Hendry,** named sales manager, Standard Control Div., Beaver, Pa.

James D. Deneau, appointed Michigan district account executive, **Bay State Abrasive Products Co.,** Westboro, Mass.

Robert J. Laws, named asst. chief engineer, **Baker-Raulang Co.,** Cleveland.

Roy E. Goodwill, Jr., named representative, Detroit, **Allis-Chalmers Industries Group.**

EDWARD P. GILLANE, elected president, Pratt & Whitney Co., Inc., West Hartford, Conn.

WILBUR H. PETER, JR., elected vice president and general manager, Electric Controller Div. Square D. Co., Cleveland.

W. J. KLEIN, elected vice president and director, sales, Tractor Group, Allis-Chalmers Mfg. Co. Milwaukee.

JOHN JEPPSON, elected vice president and general manager, Abrasive Div., Norton Co., Worcester, Mass.

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AN ENCYCLOPEDIA OF THE IRON AND STEEL INDUSTRY

by A. K. Osborne

The purpose of this Encyclopedia is to provide a concise description of all the materials, plants, tools and processes used in the Iron and Steel Industry, and in those industries closely allied to it, from the preparation of the ore down to the finished product; and to define the technical terms employed.

The book is intended as a work of reference, not in any sense as a textbook; but the specialist might usefully look to it for information on subjects bordering his own. In particular, it is the author's hope that the book will prove of value to those smaller firms in the Iron and Steel and allied Engineering industries which have not yet attained sufficient size to warrant their maintaining a library of their own.

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Byron E. Coon, named general sales manager, Delta Power Tool Div., **Rockwell Manufacturing Co.,** Pittsburgh; **Irving G. Meyer,** named sales and products manager, **Delta Homecraft.**

John Strother, named regional manager, **All-State Welding Alloys Co.,** White Plains, N. Y.

Following appointments are within the Meter and Valve Div. of **Rockwell Manufacturing Co.,** Pittsburgh. **W. M. Connor,** named assistant to vice president, Pittsburgh; **Earl Hudson,** named general manager, DuBois gas meter plant; **A. A. Fomilyant,** named general manager, Porterville plant.

Bruce H. Atwater, appointed sales manager, **Pastushin Aviation Corp.,** Los Angeles.

Robert E. Miller, appointed staff assistant to general manager, Architectural Div., **Kawneer Co.,** Niles, Mich.

Howard A. Vernay, Jr., appointed New York regional manager, **Dravo Corp.; Charles E. Snyder,** named Chicago regional manager.

Robert A. Dahlberg, appointed assistant chief inspector at Indiana Harbor Works, **Youngstown Sheet and Tube Co.**

J. Robert Jones, vice president, sales, **Kearney & Trucker Corp.,** appointed Director of Metalworking Equipment Div., Business and Defense Services Administration, **U. S. Dept. of Commerce.**

T. F. deCapiteau, named assistant sales manager, Culvert Div., **Republic Steel Corp.,** Canton, O.

Marvin J. Bair, elected vice president, sales, **Pittsburgh Steel Co.,** Pittsburgh; John C. Cercone, named general manager of sales.

PHILLIP DELMER, named manager, hydraulic press sales, Clearing Machine Corp. Div. of U. S. Industries, Inc.

I. R. LEHENEY, named district manager, Cleveland district sales office, Allegheny Ludlum Steel Corp., Pittsburgh.

RALPH C. REINHART, named director, manufacturing, Baker-Raulang Co., Cleveland.

ALBERT W. ROHDE, appointed director, purchasing, Crown Cork & Seal Co., Inc.,

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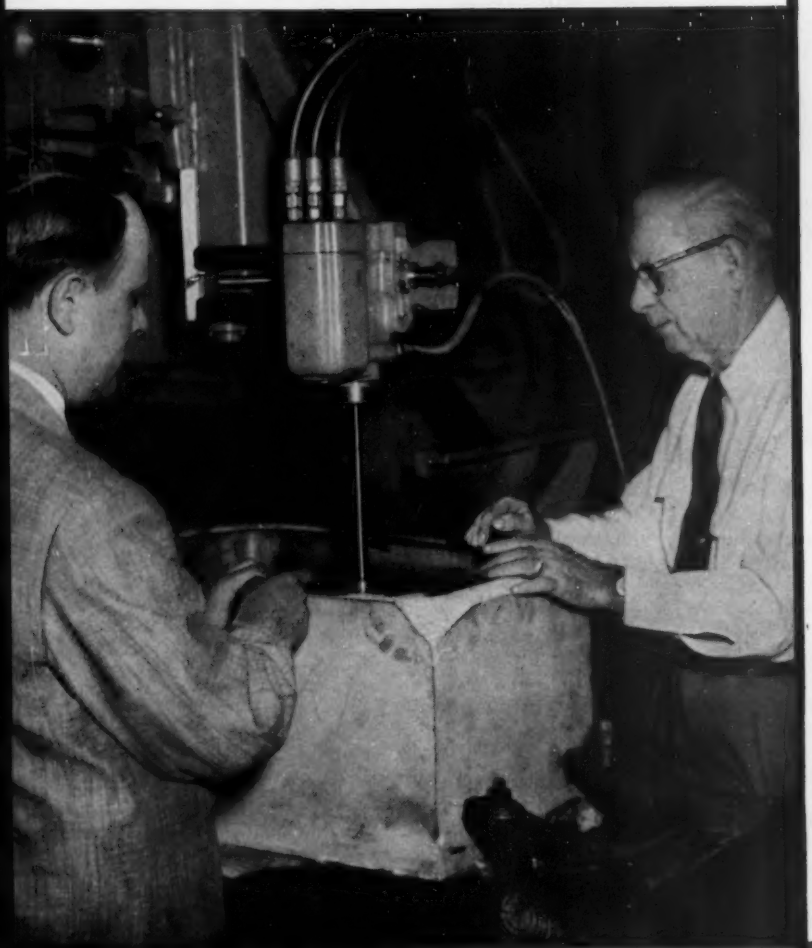

A. T. Wallace (right), President of Wallace Tool and Die Company, and Standard Oil lubrication specialist, H. A. Peterson, check sensitivity of new Cincinnati Hydro-Tel Milling Machine which uses STANOIL as hydraulic medium. Howard Peterson has been providing technical service to customers since joining Standard Oil. He is a graduate of General Motors Institute. Howard's customers find this experience pays off for them.

Delicate operations with metal requiring almost a surgeon's skill are every day stuff to Wallace Tool and Die Company, Indianapolis. Recently, they purchased a Cincinnati Hydro-Tel Milling Machine for their highest precision work. They selected STANOIL Industrial Oil for the hydraulic medium. The reason for choosing STANOIL: they wanted a hydraulic fluid that could deliver high performance. They wanted a clean hydraulic system, free of deposits that might clog filters and interrupt operations. They wanted smooth operation without pump chatter and without foam. They got these with STANOIL.

How did Wallace Tool and Die come to choose STANOIL? The answer is not hard to find. They had used STANOIL for hydraulic systems throughout their plant for many years. It has given them the results they wanted so it was natural to pick STANOIL for their new Cincinnati machine.

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SIR HENRY BESSEMER *concentrated on steel metallurgy when England needed cannons for the Crimean War. Steel was then being made from wrought iron by the slow, costly crucible method. He sought to produce it faster by blowing air through molten pig iron. His first attempt, in 1854, succeeded.*

But Bessemer's process required Swedish iron and could produce only high carbon steel. With English irons, it failed completely. For years, Bessemer tried to produce mild steel. The final solution came when manganese was added in the form of spiegeleisen, opening the door to the modern age of steel.

Great Names in Steel Making #III

When you look at Henry Bessemer's great achievement, two things stand out. First, his research was prompted by a critical war-time need. Second, his process was not perfected until freed from its dependence on imported iron.

Men familiar with modern rolling mill practice will note interesting points of similarity in the development of an all-American lubricant replacing palm oil.

The search for such a lubricant began during World War II, when the palm oil then indispensable for cold rolling had to be imported across submarine-infested oceans. Success came midway in the Korean War, when Ironsides engineers announced the perfecting of Palmoshield, "the palm tree that grows in Ohio."

Palmoshield ended, forever, our country's dangerous dependence on imported palm oil. Within six months of its appearance, two-thirds of our major tin plate mills were using or testing Palmoshield. In the four years since, its application has steadily broadened to the rolling of sheet, long terne and coating lines as well.

Palmoshield has every desirable characteristic of palm oil, but is compounded entirely of domestic materials. It need not be stockpiled. Fatty acid content can be controlled within ½%. Most gratifying of all, in mill after mill its use has resulted in increased production.

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50% INCREASE IN PRODUCTION

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WITH RANSBURG ELECTRO-SPRAY		BY FORMER HAND SPRAY	
Output, 375 panels per hour with 3 men		Output, 250 panels per hour with 4 men	
	per panel		per panel
Labor and overhead	.06	Labor and overhead	.12
Paint & lease cost	.017	Paint cost	.044
TOTAL COST	.077	TOTAL COST	.164

Want to know what Ransburg Electro-Spray can do for you in YOUR finishing department? Write for our new No. 2 Process brochure. It tells the WHAT & HOW of electrostatic spray painting, and with numerous production-line examples, shows how other manufacturers are cutting finishing costs... increasing production, and improving the quality of their work with Ransburg equipment. Too, we have available now a new movie, "The Big Attraction," a 27-minute sound and color film on electrostatic spray painting.

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Indianapolis 7, Indiana

RANSBURG

PERSONNEL

Douglas F. Woolley, Jr., named sales engineer, Corrosion Engineering Dept., **Pennsalt Chemicals,** Philadelphia, Pa.

Sandford Krasky, named purchasing agent, **Elizabeth Iron Works, Inc.,** Union, N. J.

Robert C. Shoemaker, named supervising engineer, patents and products analysis, **Hyster Co.,** Portland, Ore.

Frederick A. Fielder, named general sales manager, Lowey-Hydropress Div., **Baldwin-Lima-Hamilton Corp.,** Philadelphia.

George L. Barton, named manager, special products sales, **Greist Manufacturing Co.,** New Haven, Conn.

Following appointments are within the Truscon Steel Div. of **Republic Steel Corp.,** Youngstown, O. **E. H. Nichols,** named manager, sales, industrial products; **W. C. Conger,** named manager, sales, special projects; **J. D. Kirkwood** named manager, sales, steel joist and tower products.

Kirby F. Thornton, appointed asst. manager, Sales Development Div., **Aluminum Co. of America,** New Kensington, Pa.

Donald L. LeVelle, appointed assistant pig and ingot product manager, **Kaiser Aluminum & Chemical Sales, Inc.,** Chicago.

Arthur G. Newman, named manager, employee and plant community relations, industrial computer section, **General Electric Co.,** Syracuse, N. Y.

Walter S. Beanblossom, named administrative assistant to management, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.

Autrey Z. Partain, appointed sales service representative, Protective Coatings Div., **Pittsburgh Coke and Chemical Co.,** Tulsa, Okla.

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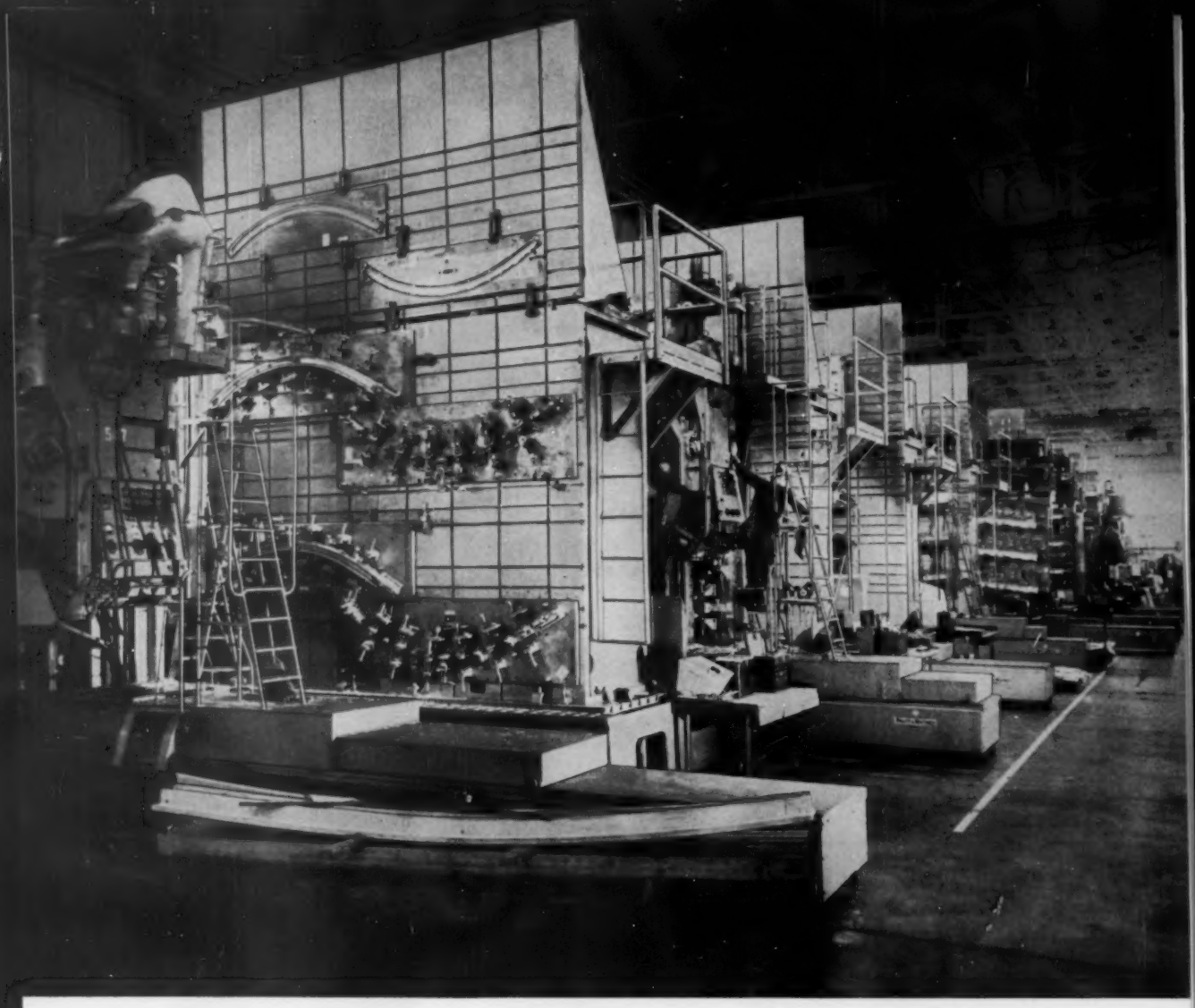

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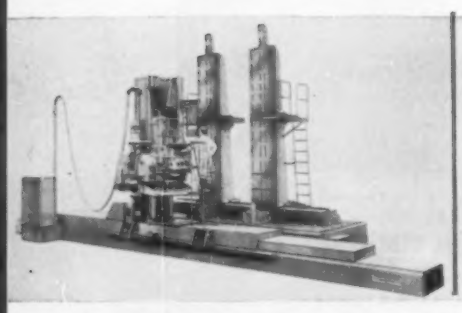

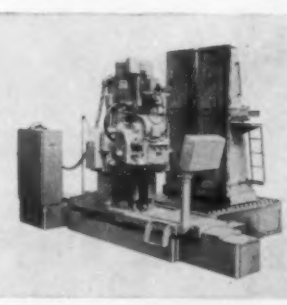

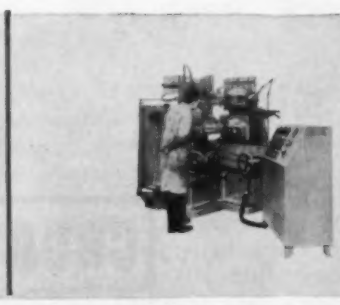

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Augmenting the already great versatility and productivity built into all KELLER Machines, Tool Engineers have developed ingenious trunnion fixtures (like those shown in the adjacent picture) that make it possible to re-position the components quickly for several successive machining operations . . . *without* production stops to remove the work and change fixturing.

KELLERS

of jet age production

These on-the-job scenes taken in the plant of a leading aircraft manufacturer typify the swing to KELLER throughout the Aviation Industry. To provide the maximum strength-with-lightness necessary to withstand the terrific stresses of jet age flight, increasing numbers of large, complicated components are being forged as single units and then machined over their entire surface. And making it possible to mill accurately all the complex, 3-dimensional shapes involved — on an efficient, production basis—are these rows of Pratt & Whitney BG-22 KELLER Tracer-Controlled Milling Machines . . . powerful, versatile giants that handle a wide variety of large workpieces.

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Your own "On-Location" Generator can provide you with a continuous supply of oxygen regardless of your requirements—including moderate to large tonnage users. We will furnish and install a complete facility at no capital investment on your part—on a lease basis including a purchase option. If you prefer, we will operate and maintain the facility and guarantee your oxygen savings.

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FEATURE ARTICLES

Grows with steel—

Tonnage Oxygen: Pressure Under A Big Market

By J. J. OBRZUT, Technical Editor

◆ Steel's expansion ties in closely with oxygen steelmaking processes . . . Oxygen consumption has already started to skyrocket, yet it's only the beginning of a trend that's taking a firm hold . . .

◆ In addition to the established oxygen converter, blast furnace oxygen enrichment and use of the oxygen lance for decarburization, a new Swedish technique is about to make its debut . . . It all adds up to a tremendous expansion in oxygen production in the next ten-year period.

◆ WITH STEELMAKING capacity due for about a 15-million ton boost in the next three years, it's a pretty safe bet that oxygen producers will come in for a sizeable chunk of business. As the oxygen steelmaking processes gather momentum, oxygen consumption will skyrocket. Just how high the figures will reach within the next 10 years is anybody's guess, but they're bound to be astronomical by today's standards.

Oxygen consumption has climbed steadily from about 5 million cu ft per month in 1910 to a present consumption of more than 2¼ billion cu ft per month. Much of this consumption has been due to increased steel production, but perhaps even more significant has been the trend to greater use of oxygen per ingot ton of steel produced.

In 1930, estimates placed oxygen use at 30 cu ft per ton of steel produced. By 1940, this figure climbed to about 50 cu ft per ton. Use of oxygen more than doubled per ton of steel over the next 5-year period. At the present time, about 175 cu ft are used for every ton of steel. As yet, the oxygen steelmaking processes have not been reflected in these figures to any great extent.

A recent analysis of three steel mills over a three-month period shows that scarfing operations are the biggest consumers of oxygen. During that period, more than half the total consumption of nearly 2 billion cu ft was used for scarfing, both manual and mechanized. Table 1 shows a breakdown of consumption by processes.

The demand rates of large scarfing machines point up the need for a large, steady and low-cost oxygen supply. A modern machine for scarfing four sides of a slab can consume as much as 560,000 cu ft of oxygen per hour in continuous

operation. With a duty factor which may run up to 25 pct, daily requirements would exceed 3 million cu ft. Of the more than 50 scarfing machines now in operation, many have lower demand rates. However, the duty cycles are considerably higher, sometimes as high as 75 pct as in the case of small billets which are scarfed on four sides simultaneously by such automatic equipment.

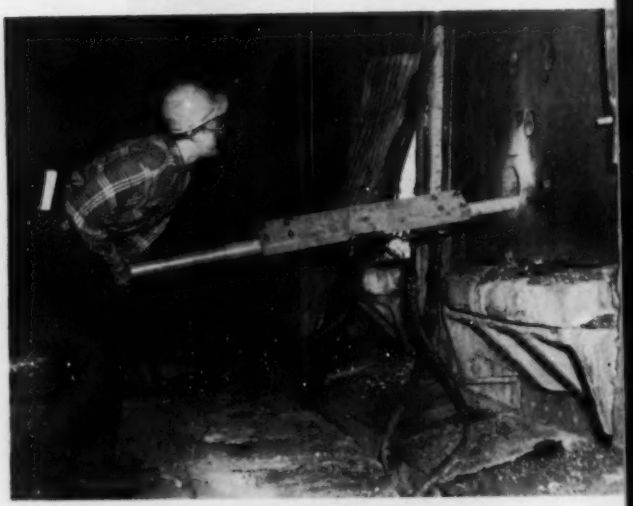
The big push for oxygen in steelmaking is only beginning. It's a foregone conclusion that the 15-million ton expansion in steel capacity over the next three-year period will be implemented in large measure by the newer oxygen steelmaking processes.

Process gains ground

The oxygen converter process is already in use at Dominion Foundries & Steel Ltd., Hamilton, Ont., and McLouth Steel Corp., Trenton, Mich. In the design and construction stages are the installations at Jones & Loughlin's Aliquippa Works and Kaiser Steel's Fontana plant. Two other steel firms are also reportedly ready to take the plunge. Based on a figure of 2000 cu ft per ingot ton of steel produced by this process, the yearly high-purity oxygen requirements in the U. S. alone will exceed 145,000 tons by the end of 1957. Estimates place annual consumption at more than 300,000 tons by 1960.

In addition to the Linz-Donawitz process, a new Swedish oxygen steelmaking technique has been operating since May of this year. The process is a complete success and has been turning out commercial steel for a number of months. (A complete exclusive story on this latest Swedish development will appear soon in THE IRON AGE.)

Over the past five-year period, Weirton Steel Co. has been gathering data on the use of oxygen for blast furnace enrichment. These results were presented by J. H. Strassburger in a paper delivered before the AISI recently. The data showed that oxygenation of the blast increased iron tonnage proportionately. Oxygen enrichment of 1.5 pct results in a 7 pct increase in equivalent wind volume and an increase in iron tonnage by 7 pct. With a 2-pct enrichment, iron tonnage can be increased 9.5 pct.



OXYGEN LANCE used for decarburizing the open-hearth charge offers oxygen producers a potentially large market in the immediate future.

Oxygen enrichment up to 3 pct has been used by Weirton. However, having a 450-ton per day oxygen plant, 400 tons of the daily supply are divided to provide for a 1.5 pct enrichment in four furnaces. Overall costs above those for materials have been lowered, and other additional benefits prove that the process is economically feasible. In view of Weirton's experience, it appears likely that other steelmakers will consider the process seriously in their expansion plans.

With the higher temperatures required for ferro-manganese production, oxygen enrichment in the blast furnace can increase output by 20 to 25 pct.

For the immediate future, oxygen producers

STEEL MILL OXYGEN CONSUMPTION

TABLE I

(Three-plant totals over three-month period)

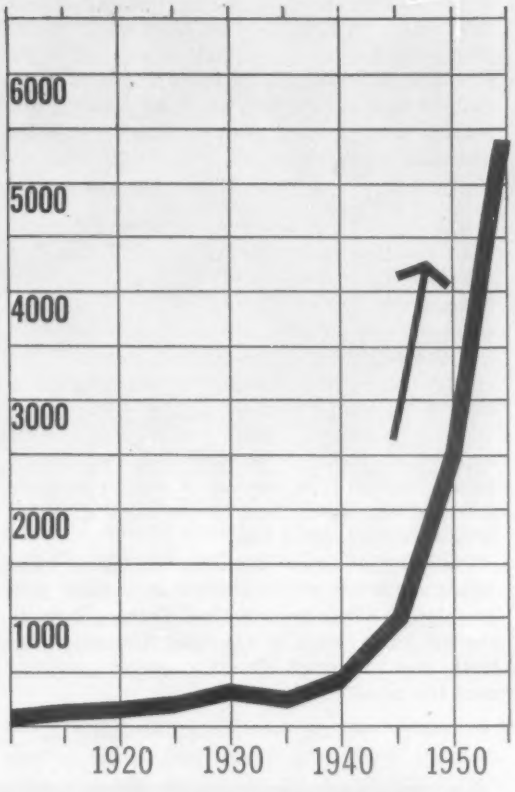
Application	Average Cu Ft Per Month, Millions	Per Cent
Machine Scarfing	10.8	15.6
Hand-Scarfing	24.3	35.1
Open Hearth Combustion	6.1	8.7
Open Hearth Decarburization	4.4	6.4
Electric Furnace	2.2	3.2
Oxygen Blowing	15.7	22.6
Scrap Preparation	2.6	3.7
Furnace Lancing	0.7	1.0
Plate and Slab Cutting	1.1	1.5
General Maintenance	1.5	2.2
Total	69.4	100.0

Estimated ingot tons of steel produced per month over same period—390,000
Cubic feet of oxygen per ingot ton of steel—178

TOTAL OXYGEN OUTPUT

High and Low Purity

Millions of Cubic Feet per Month



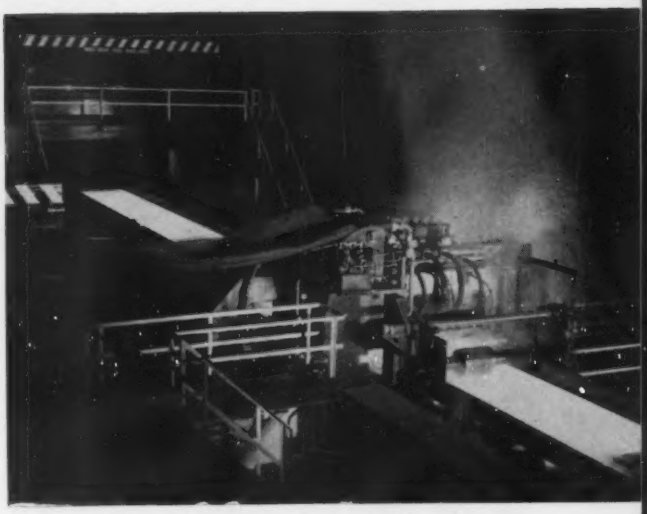
believe their greatest potential gains lie in the open-hearths. Here, oxygen is already being used for decarburization by injecting it through a ¾ or 1-in. lance directly into the molten metal. This process requires about 200 cu ft of oxygen per ton of steel.

Perhaps even more significant is the use of oxygen enrichment to increase flame temperature. By so doing, heat time can be reduced drastically, enabling greater production within a given time. Oxygen for this purpose amounts to less than 1000 cu ft per ton of steel.

Exclusive of the present heavy military requirements, steel production and metal fabricating industries consume a large portion of the total oxygen output. The chemical industry is the other user of tonnage quantities. The remainder is divided among the smaller users—hospitals, railroads, garages, etc.

It's difficult to conceive what our oxygen requirements will be by 1965. Existing open-hearths have an annual output of about 110 million tons of steel. Assuming the use of 600 cu ft of oxygen per ton of steel in 60 pct of the open-hearths, this would amount to a daily requirement of about 4500 tons.

Again assuming annual blast furnace capacity



SINCE 1935, automatic scarfing machines have been doing a fast, effective job of removing surface defects from slabs and billets. Today, there are more than 50 machines in use.

of 65 million tons, requiring 2000 cu ft of oxygen per ton of pig iron, the additional daily oxygen requirement would jump another 15,000 tons. Of course, these figures are optimistic, but add to these the increasing demands for military and chemical industry needs and the tightening picture becomes more real.

What are the producers doing to cope with these high demands? Anticipating the surge, they stand ready to supply every need for production. Linde Air Products Co., for example, has installed 12 tonnage oxygen plants capable of turning out more than 1 billion cu ft per month, to supply single-customer needs in the steel and chemical industries. Seven of these went on stream in 1956. Over 20 more are due for installation within the next 18 months.

Air Reduction and National Cylinder Gas are expending huge sums to build new facilities as well as to expand existing plants as rapidly as possible. Leading the parade among equipment builders is Air Products, Inc., which is heading for gross sales approaching $37 million. Also competing for on-site business are Blaw-Knox Co. and Hydrocarbon Research, Inc.

ACKNOWLEDGMENTS

The author thanks the following firms for their cooperation in supplying the information for preparation of this article: Air Products, Inc., Air Reduction Sales Co., Kaiser Engineers and Linde Air Products Co.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

On nonferrous rod—

Carbide Dies Hoist Output On Hot Extrusion Line

◆ CHROMIUM CARBIDE dies make a big difference on one automated hot extrusion line. Steel dies used earlier did the job, but required frequent changing. In extruding brass rod of one diameter, carbide dies last up to 20 times longer than those of steel.

Two major problems cropped up in hot extruding brass at the Port Huron, Mich., plant of Mueller Brass Co. First was a situation involving unpredictable product size—more specifically, trouble with tolerances. Then varying hardness of the extrusions brought trouble when the metal entered later drawing operations.

Attain automatic operation

Dies of chromium carbide, suggested by General Electric's Metallurgical Products Department, help control both variables. In addition, application of the dies also enables the company to automate its hot extrusion lines as originally planned.

In hot extruding free-machining brass rod, an 8-in. diam billet may reduce to 400 ft of 0.441-in. diam rod. To hold product size under such conditions with previous dies, operators found it necessary to change them frequently. This also served to prevent unnecessary cold work of the material when subsequently drawn.

Frequent die changes did slow production. Press downtime bottlenecked the automatic sequence of the hot extrusion process.

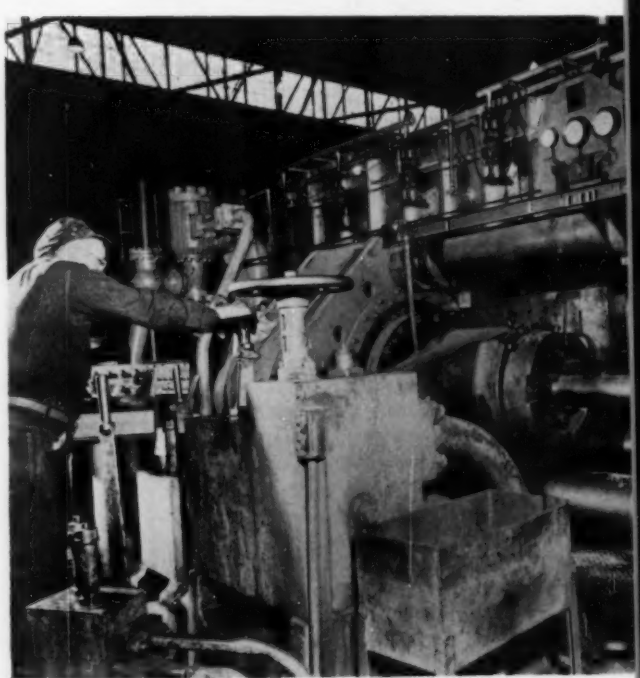
But with introduction of chromium carbide dies, the production picture changed. Tolerances in the case of the 0.441 in. diam brass rod now fall within ±0.006 in. consistently. Tonnage production has hit a new high. Operation of the 2750-ton, double-action Lowey press is so rapid that it's necessary to feed billets through the preheating furnace in six rows to keep up with the fast pace of the press.

Outlast other dies

One carbide die, it's reported, now duplicates the cumulative production of about 20 dies used formerly in extruding 0.441-in. brass rod. Performance varies with other size work. Considering work of all sizes, as well as jobs involving double hole-type dies, the chromium carbide dies provide an estimated setup life advantage of a little better than 5 to 1.

Company records reveal that in one specific instance, a carbide die processed 1500 billets before removal from service. A similar steel die extruded only 250 billets to the same diameter before wearing out of size.

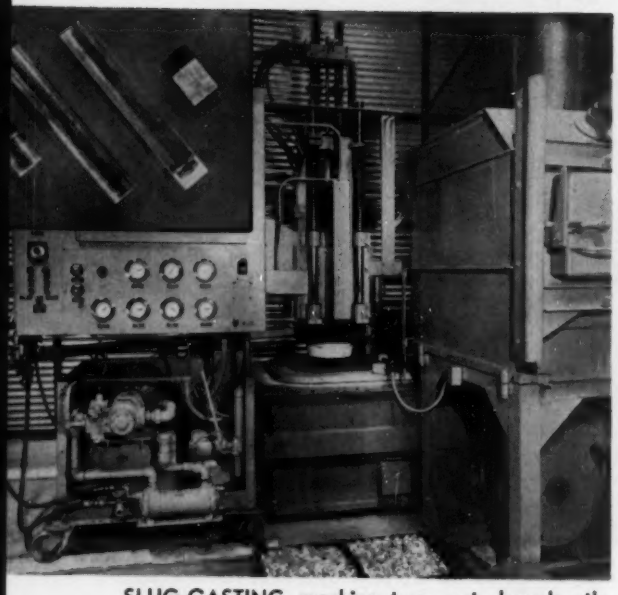
Plasticity of brass decreases rapidly as billet temperature drops. So smooth and rapid progression of billets from preheat furnace through the extrusion press is essential. Operator controls this sequence from a pulpit mounted near the press.



PRESS ram (right) pushes hot 8-in. brass billet through carbide dies. Preheat furnace is at rear, feeds billets directly to press.

No scrap loss—

Shape Impact-Extrusion Slugs From Ingot



SLUG-CASTING machine turns out slugs by the basketful, without scrap loss. Inset shows enlarged view of slug and part produced from it at one press stroke, plus sectioned views of both.

◆ PROCESS efficiency and product quality in making impact extrusions stem from uniform slug size and grain structure, freedom from porosity and other defects. With such slugs specially designed presses form intricate parts in a single operation.

Heretofore, these slugs had been produced by blanking from sheet or plate or by cutoff from bar or rod. But these methods meant considerable scrap loss. At the same time, they involved scheduling and manufacturing problems for the contract impacter.

Recently the impact extrusion technique has been greatly simplified by the development of a machine which produces slugs directly from ingot. This is done in one operation, without scrap.

Million extrusions made

Impax, Inc., a Universal Match Corp. subsidiary, pioneered the new development, after three years production of impact extrusions for use by the armament division of the parent corporation. Need for such a machine became apparent early in this program. Its inventor, Mr. George Harrison, and the Stroman Furnace Company, spent more than two years with the Impax staff in developing and operating the machine.

During this time, more than a million extrusions were made from the cast slugs. The machine was then installed in a specially built foundry, adjacent to the Impax extrusion facilities in Ferguson, Mo.

Operation of the machine is simple. A multiple-cavity water-cooled mold is automatically immersed into a pot of molten metal. Vacuum is then applied to draw the metal into the cavities at a predetermined rate. At the proper point in the operation the mold is removed from the pot as the gates are simultaneously cut off.

Slugs thus produced are automatically discharged by hydraulically controlled knock-out pins in each cavity.

The mold mechanism is shown in the accompanying photo in the center, just above the open pot attached to the vertical rods, which lower it into the pot of molten metal. The breakdown furnace in which ingots are melted is shown in the right foreground. This is necessary to maintain constant level and temperature in the casting pot. Both furnaces are fired with natural gas. A propane standby system is also provided.

The automatic control system for the furnaces and the hydraulically operated mechanisms are shown on the left. The entire machine is located on rails for easy access to the furnace and for ease of maintenance.

At present the slug caster's production is confined to aluminum slugs for the growing volume of sales of impact extrusions. Impax hopes to extend the process to magnesium in the near future, to other metals shortly thereafter.

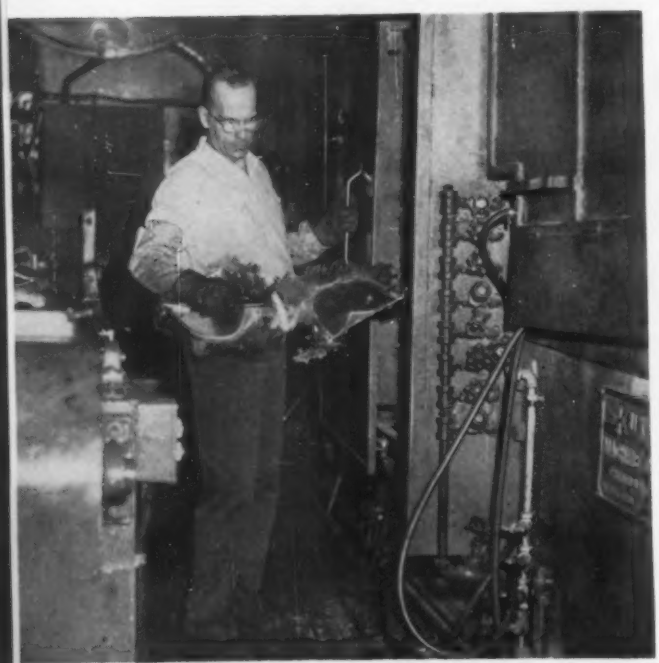
Making diecastings?—

Trim Flash Quickly With Press Die Setup

By HERBERT CHASE, Consultant, Forest Hills, N. Y.

◆ Fast, effective post-casting cleanup of diecastings is essential to realizing fullest advantages of the process . . . Power presses are one good way to trim sprues, gates, flash . . . Good planning can minimize manual handling required.

◆ At Brown-Lipe-Chapin Div., castings are mass-produced by a double bank of diecasting machines . . . From quench tanks, castings are conveyorized to trim presses, supplemental grinding, buffing operations . . . Scrap returns for remelt.



REMOVING GATE of two castings from diecasting machine, operator dunks it in quench tank (left). This cools it prior to cleanup operations.

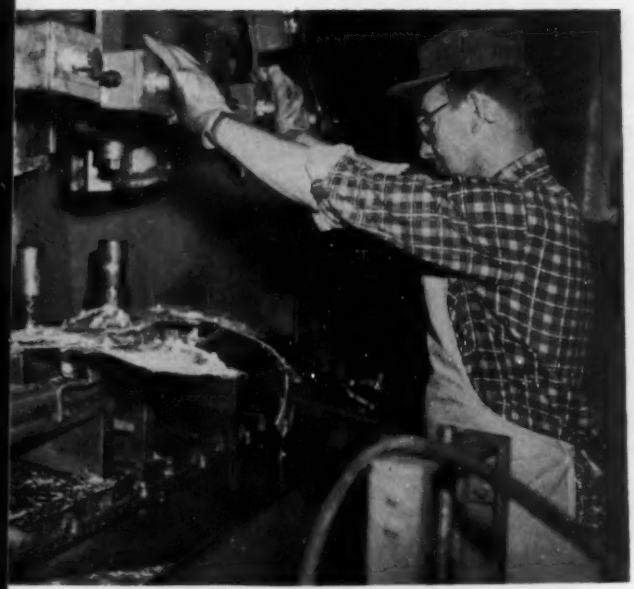
◆ PRODUCTION-WISE, zinc diecasting has many points in its favor. Parts produced have good physical properties. They cast easily and rapidly. They're low in cost and of good finish. They can be prepared for plating and plated at lower expense and with better appearance than many other alloys.

Capitalizing most fully on these advantages requires, though, that subsequent clean-up operations on castings be handled with equal ease and economy.

The new Syracuse, N. Y., plant of GM's Brown-Lipe Chapin Div. furnishes a good example of how efficiently such a cleaning-up operation can work. Here, sprues, gates and flash are removed from castings by power presses supplemented by other machines. Some of these machines remove flash from holes. Others do tapping or perform other light operations, including grinding of parting lines.

This stage of operation starts with removal of castings from diecasting machines arranged in dual rows. Castings are first dunked in quench tanks by hand. This cools them before cleaning. They're then advanced by conveyor belt running below the quench to the trim press lines.

Press line setups vary. Where proper trimming of flash can be done in one die, especially



CLOSING, this large trim die shears sprue, gates and flash from castings. These drop into chute.

a push-through die, this type is employed. This is partly because the casting, unless it is quite large, is allowed to drop onto a cleated elevating belt for subsequent advancing to other operations. Some castings can be trimmed two or more at a time in multiple-recess dies, but others require two or more trimmings because of their shape or to remove flash in holes or recesses.

In these latter cases, castings are usually advanced to the second or third press in chutes or by belt, in such a way that time for handling is minimized. In some cases, however, it is economical to use two trim dies or even three in succession in a large press. The second die then does work not feasible in the first, or done to better advantage by two or more dies.

Trimmed scrap is remelted

Many gates include two or more castings. But if two or more are trimmed simultaneously the spacing must either match precisely that in the die or the latter must exert a self-locating effect. Thus, if shrinkage varies, the castings will be located properly before the die is fully closed.

Scrap material is remelted. Often, sprues, runners and flash have to be cleared from trim dies by hand or by brush, though air ejection is applied where feasible. This material is thrown in chutes, which discharge it into a vibrating conveyor returning it to remelt furnaces.

Press trips are arranged so that they cannot be operated until the operator's hands are pressed against the dual trip buttons safely out of harm's way.

Some castings have holes from which flash is removed more readily or to better advantage by drilling than by a piercing punch. Also, it is sometimes better to drill than to core small holes, and many holes that are cored have to be sized, spot faced, reamed, chamfered or tapped. Such operations are performed as a rule in the cleaning department. In some cases, a multiple drilling or tapping head is used.

In one such application, multiple drills are operated through a bushing plate. This permits holding close center distances and raises when loading and unloading as well. This helps because the casting involved is so shaped it would not clear the fixture otherwise.

Fixtures are custom-fitted to job

Naturally, each fixture and in some cases even the machine itself is made to suit the particular job to be done. One such special combined fixture and machine drills holes in a Buick scoop casting of odd shape. These drilling units are compact and are made to advance and retract drills automatically when air is turned on.

Not using them would mean that two or more drill presses, each with its own fixture, would be required. Handling through both fixtures would be needed as well.

In other cases, a standard machine with a hand-operated clamping fixture is best for the job. In one instance a large stepped central hole is machined in the hub of a horn ring from which flash has already been trimmed. The ring then goes to adjacent sanders having narrow belts that run over a pulley much smaller than the openings between spokes and ring.

Following cleanup operations, castings are in most cases advanced to polishing equipment. Purpose here is to smooth such surfaces as may require this treatment before buffing or its equivalent readies castings for plating.

Most castings are produced with the smooth surfaces generally called "hardware finish." These surfaces buff readily, but certain areas, notably at parting lines, commonly have to be ground and polished before buffing can provide surfaces suitable for plating.

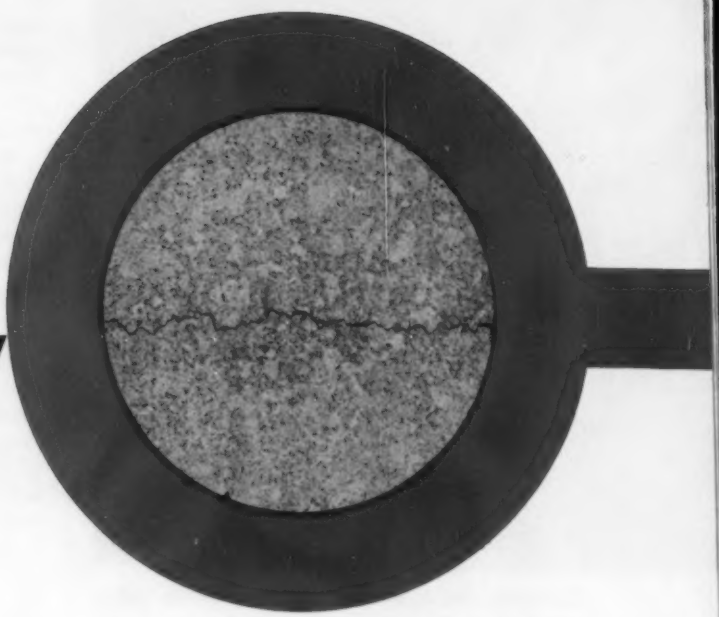
In the case of the horn rings, while flash already has been trimmed from the openings by punches they leave the parting lines showing. These have to be removed. With a small pulley that can pass through the openings, all parting marks are accessible to the belt and it is the best means for grinding them away.

Castings ground in this manner and many others, in which external partings are ground on glued abrasive wheels, are placed on chain conveyors and are advanced thereon either to buffing machines or to other equipment performing equivalent operations prior to plating. In general, most of the exposed surfaces to be plated are cast so smooth as to make only light buffing necessary.

Both grinding and buffing are commonly needed at partings, though, if the parting line is at all prominent when the casting is put into service.

Full-scale review—

What Do We Know About Hydrogen In Steel? Part I



BY C. R. SIMCOE, Metallurgist,
Battelle Memorial Institute,
Columbus, O.

◆ Remember the hawker's claim that you can't follow the game without a score-card? . . . Applied to the critical problem of hydrogen entrapment in steel, this time-worn corollary becomes a lot more meaningful . . . It is the facts that count.

◆ This two-part series reviews virtually all that is known about hydrogen in steel . . . A comprehensive survey of significant research, it is basic reading for both steelmakers and steel users.

◆ TO SOME DEGREE, hydrogen is probably present in all of the steels we use—including the structural and the special purpose grades. Present knowledge indicates that its presence is essentially detrimental. It must be regarded as a difficult, and sometimes disastrous, impurity. The object in steelmaking must be directed toward limiting—if not eliminating—the *amount* of hydrogen present.

This presents a considerable challenge. For one, hydrogen is very likely the most difficult to study of all solute elements in steel. Amounts present are usually extremely small, from less than 1 to at most 10 to 12 ppm. Its presence cannot be detected metallographically. And yet the problems it poses in processing or using steel are crucial: porosity, flaking, loss of ductility, and delayed fracture.

What are the sources of hydrogen contamination? In general, the gas is introduced into steel by four methods: (1) by reaction with water vapor or nascent hydrogen during the steelmaking process, (2) by holding the steel at an elevated temperature in an atmosphere containing hydrogen, (3) by making the steel the cathode of an electrolytic cell, and (4) by pickling or chemical attack.

Many of the processes of cleaning and fabrication will cause steel to absorb hydrogen.

From a research standpoint, it has not been possible to maintain a constant, uniform distribution of hydrogen in a piece of solid steel. Since hydrogen readily diffuses out of steel, even at room temperature, it is very difficult to study the variation in mechanical properties as a function of hydrogen content.

Despite these difficulties, considerable research work has been done on the introduction, diffusion, and extraction of hydrogen from steel. A curve was determined showing the removal of

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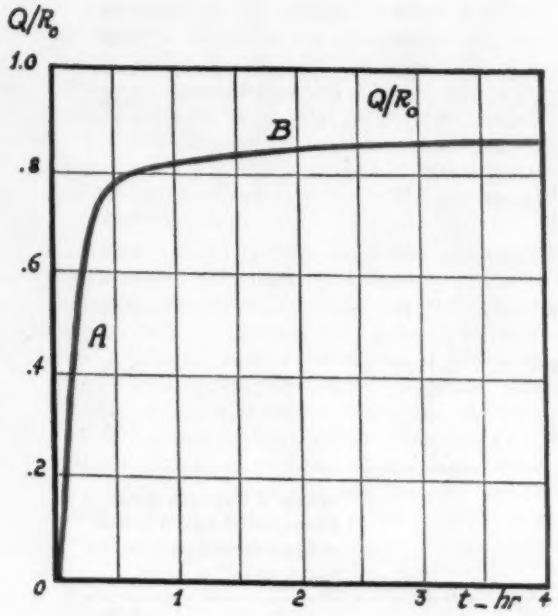
First of a two-part series, this article reviews significant research on the subjects of permeability, solubility, diffusion and flaking as they apply to hydrogen content in steel. The concluding installment, dealing with embrittlement, delayed failures and other important effects, will appear in the Oct. 11 issue.

(Left) Delayed crack in high-strength steel produced by hydrogen during cathodic charging.

FIG 1—(below) Extraction of hydrogen from samples ½ in. diam. by ½ in. long in vacuum at 600°C.



hydrogen from steel in vacuum at 600°C as a function of time.[1] This extraction curve (Fig. 1) exhibited an initial period of rapid evolution, which was essentially over within one-half hour with specimens ½ in. in diameter and ½ in. long. This was followed by a second period of very slow evolution.

Some investigators have interpreted this behavior as evidence for two different forms of hydrogen in steel; the form which is easily evolved being the hydrogen in the normal interstitial lattice sites, and the form which evolves more slowly or only at higher temperatures being molecular hydrogen located in lattice discontinuities.

Indicates one form only

These authors have shown that the shape of the extraction curve is that which would be expected if the extraction process were diffusion controlled. It does not indicate the existence of two different forms of the element, hydrogen. They further state that the time necessary for the extraction of a given substantial portion ot the hydrogen is independent of the total content of the gas and depends only on the diffusion coefficient and on the dimensions and geometry of the sample.

Other investigators found that the extraction of hydrogen from steel was influenced to some extent by the method used in introducing the hydrogen into the steel.[2] When the specimens were thermally charged with hydrogen at 1000° to 1350°C and then water quenched, all the hydrogen could be extracted in less than 1 hour at a temperature in the range of 300° to 650°C and the rate of removal equaled the calculated rate assuming a single value for the diffusion coefficient.

When the same material was saturated with hydrogen at 650°C and a pressure of 75 atmospheres, there was evidence of both rapidly diffusing and slowly diffusing or residual hydrogen. At temperatures of 385° to 575°C, only 80 to 90 pct of the hydrogen was extracted at a constant diffusion coefficient compared to the previous sample, after which there was a decrease in the rate at which hydrogen was evolved. Subsequent heating at 850°C resulted in a rapid evolution of the remaining hydrogen.

Thus, the form in which hydrogen exists in solid steel is still a subject of controversy.

Study diffusion, also

Diffusion, or more correctly, the permeation of hydrogen through solid steel has also been studied. These investigations generally consisted of constructing an electrolytic cell around a hollow steel cylinder or on one side of a flat disk. When the cell was operated, the hydrogen entered, diffused through, and left the steel from the opposite surface where it was collected and measured.

One test program studied the permeation of hydrogen through a steel cylinder in a 5 pct sulphuric acid electrolyte with a current density of 0.304 amp/mm² and a temperature of 15° to 18°C.[3] In these experiments, the grain size, carbon content, and structure of the steel were varied. The effects of variations in grain size are shown in Table 1, where both the time for evolution to begin and the steady-state rate of permeation are shown.

These figures indicate that, as the grain size decreased, the time increased for a measurable amount of hydrogen to be collected. However, once the steady-state condition was reached, the rate was approximately the same for all grain sizes. This behavior is taken to indicate a greater solubility for hydrogen in finer grained steel.

When the carbon content was increased from 0.06 to 0.59 pct, the time for evolution to begin also increased, and the steady-state rate of permeation decreased. Likewise, when the structure varied from coarse pearlite plus ferrite to martensite, the time for evolution to begin increased and the steady-state rate decreased.

It was also found that the rate at which hydrogen permeated steel was dependent, to a large extent, upon the structure.[4] For example, the amount of hydrogen which permeated specimens with different structures in a one-tenth normal solution of sulphuric acid, and at a cur-

Table 1—Effect of grain size, composition and structure on diffusion of H_2 through steel.

Grains/mm	Hardness, VPN	Time for Evolution to Begin, minutes	Steady-State Rate, cm^3/hour
29		36	0.32
63		65	0.32
102		90	0.30
157		102	0.29
178		128	0.28
Carbon Content, per cent			
0.06	98	18	0.44
0.31	156	25	0.28
0.59	202	39	0.22
Structure			
Coarse Pearlite + Ferrite	202	39	0.22
Fine Cementite + Ferrite	290	35	0.39
Martensite	850	45	0.14

Table 2—Effect of microstructure on the permeability of hydrogen through steel.

Structure	Amount of Hydrogen Which Permeated 1.1 Square Inches of Specimen Surface in 24 Hours, cm^3
Martensite	0.36
Bainite	0.30
Fine Pearlite	1.14
Coarse Pearlite	2.65
Normalized	2.71
Annealed	1.47
Spheroidized	1.33
Armco Ingot Iron	2.63
High-Silicon Transformer Steel	2.61
18-8 Stainless Steel	Nil

rent density of 0.9 amp/in.,^{2} varied as much as ninefold as shown in Table 2. Structures such as martensite and bainite are the least permeable. Coarse structures such as pearlite show the greatest permeability. Also, Armco ingot iron and high-silicon transformer steel showed high permeability.

Martensite absorbs minimum

Experiments also were performed where small specimens were immersed in the electrolyte and charged with hydrogen for 24 hours. These samples were analyzed for hydrogen (Table 3). Again, the amount of hydrogen absorbed was dependent upon the microstructure.

Martensite absorbed a very small amount of hydrogen compared to the other structures. Armco ingot iron, high-silicon transformer steel, and 18-8 stainless steel absorbed very large amounts of hydrogen. The results in Tables 2 and 3 indicate that the permeation of hydrogen in steel is dependent to a considerable extent on the composition and the structure of the steel. Since the reactions at the entrance and exit surfaces probably are not affected greatly by the composition or structure, it follows that the solubility and possibly the diffusion coefficient are the important dependent variables.

The absorption of hydrogen by austenite steels was studied in terms of the amount absorbed at a given current density and temperature with HCl, KOH, and H_2SO_4 electrolytes.[5] Using the pure electrolytes, the largest hydrogen absorption was obtained with HCl, and the least with H_2SO_4.

When 250 milligrams per liter of arsenic were added, the H_2SO_4 electrolyte produced the greatest amount of hydrogen in the steel, and KOH the least. It is not certain whether the addition agent aided hydrogen pickup by increasing the formation of hydrides at the surface, by producing charged collodial particles, or by increasing the overpotential.

One of the earliest problems attributed to hydrogen was flaking. Flaking is the formation of internal cracks which occurs on cooling or at

room temperature, and is especially prevalent in billets and heavy forgings. It has been reported that alloying elements are highly segregated in alloy billets and forgings, and that austenite is retained in these areas unless the cooling rate is very low.[6]

Since hydrogen is much more soluble in austenite than in ferrite, it too concentrates in these areas. When the austenite transforms to martensite at temperatures below 200°C, the hydrogen is released under high aerostatic pressure. The martensite formed from this hydrogen-rich austenite is embrittled so that it cannot adjust to the hydrogen pressure and other stresses except by rupturing.

Flaking in SAE 4340 steel was studied by isothermally transforming specimens in the intermediate temperature range and then quenching to room temperature.[7] In general, whenever the specimens were water quenched before the transformation was essentially completed, flakes formed on aging at room temperature. However, when the transformation was completed at the elevated temperature, flakes did not form. It was concluded that transformation stresses together with sufficient hydrogen to cause embrittlement were responsible for flakes.

Has effect on flaking

A further study of the effect of transformation stresses on flake formation was performed by making use of the continuous cooling transformation that occurs in end-quench bars. Five steels of various hardenabilities were used. Hydrogen was introduced into these bars by austenitizing for 60 hours at 2000°F in a hydrogen atmosphere, and after end quenching the bars were aged at room temperature for one month before sectioning.

All of the end-quench bars showed flaking except the highest hardenability steel, SAE 4340. The areas within the end-quenched bars which contained flakes were areas of similar microstructures. The distance of these areas from the quenched end increased as the hardenabilities of the steels increased. The fact that flaking did not occur in the SAE 4340 steel end-quenched bar was thought due to the high hardenability of the steel which produced mostly martensite over the entire length of the bar, thus, mixed structures containing large percentages of bainite, or high-temperature products were not present.

Hydrogen analyses showed no significant difference in hydrogen content between the flake-free areas and those exhibiting flakes. In fact, the lowest hydrogen content was found in an area of flakes, and the highest hydrogen content was found in a flake-free area. In the latter case, the transformation was complete at temperatures above the M_s. It was proposed that both hydrogen and mixed microstructures containing small amounts of martensite are necessary for flake formation.

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Table 3—Effect of microstructure on the amount of hydrogen absorbed in steel in 24 hours.

Structure	Amount of Hydrogen Absorbed in 24 Hours, cm^3/100 grms steel
Martensite	6.9
Fine Pearlite	15.9
Coarse Pearlite	46.5
As Normalized	25.0
Armco Ingot Iron	51.1
High-Silicon Transformer Steel	89.3
18-8 Stainless Steel	62.2

Meet shop emergencies too—

Electric Bolt Heaters Speed Big Press Construction

◆ Big mechanical presses are built rugged to stand up under rigors of capacity operation, occasional severe overloads . . . Most straight-side presses are of four-piece tie-rod construction . . . In assembly, tie rods are heated, then shrink-tightened to properly pre-stress the press.

◆ Many tie-rod heating methods have been tried, including torch-heating, steam, electric currents . . . Electrical resistance units prove fast and effective . . . Inserted in partially-hollowed rods, they halve heating time, find added utility in press users' plants.

◆ LARGE mechanical presses take a terrific beating over their lifetime. True, they're built to do just that. But they also have a generous safety factor to help compensate for the heavy shocks and vibration, the considerable overloads often imposed upon them.

Still, it takes real mechanical ruggedness to stand up under capacity operation and the abuse of deliberate or accidental overload. One of the problems of building rugged straight side presses is that of holding the frame tight through the constant application and release of forces on the job. Another problem is to incorporate a safety factor that will prevent complete destruction of the press in case of sudden and severe overload.

Solution to both problems lies in proper tie rod shrinking. A newly-developed electrical bolt heater helps make this both an easier and more accurate task.

But let's take a look at how presses are made to see where the need for bolt heating fits into the picture.

Builders assemble most straight side presses in what they call four-piece tie rod construction. This consists of a crown supported by two uprights that rest on the press bed. Holding these major press parts in their proper relationship to each other are long tie rods, threaded at the ends and secured by large nuts.

But builders can't be satisfied with merely cinching these down tight. Tie rods must then be pre-stressed by expanding with heat, after which the nuts are again tightened and the rods are left to shrink through cooling. This preloads the press under compression so that the frame is tied together as if it were one unit when subjected to the deflections and vibrations of normal operation.

Idea is rather simple. Just as structural steel beams are fastened together securely by contraction of hot rivets as they cool, so are straight side press frame units locked together more tightly by the cooling (and contracting) tie rods between nuts.

Usually torch-heat tie rods

Builders commonly shrink in tie rods for this press pre-loading at anywhere from 110 to 150 pct of press capacity. This shrinkage for proper preload is accurately controlled by a specific expansion per foot of tie rod length between nuts. Usually they'll heat the tie rods with a torch, through openings in the press frame provided for the purpose. This expands the metal sufficiently, but is quite a job, since it take con-

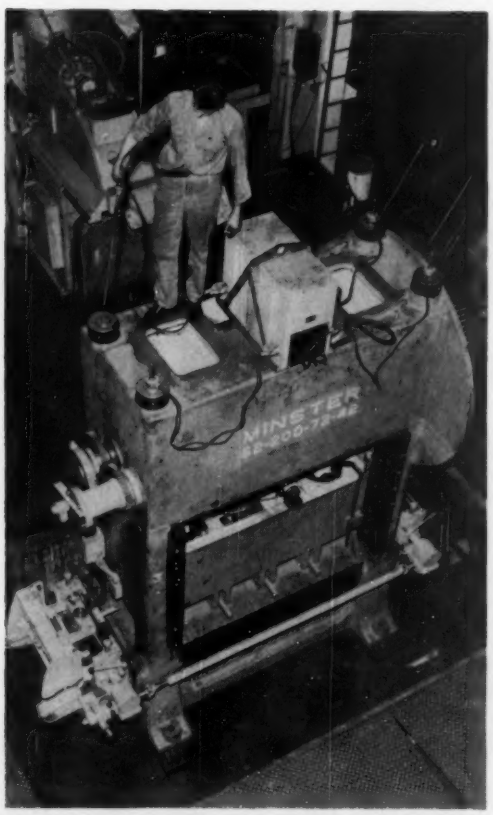
siderable time, creates moisture, and may weaken the metal besides because of localized overheating.

Other methods have been used—steam, passing a heavy electrical current through the rods, etc. But the new method, involving the use of Westinghouse Corox bolt heaters and partially drilled tie rods, is simpler.

Not only has it halved heating time formerly required, but it has given more accurate tie rod shrinking at lower cost and with no detrimental effect on the rod material.

Inserts into drilled tie-rod

The way builders work it with the new method is to insert the rod-like bolt heater into a hole drilled to a predetermined depth in the threaded end of the tie rod. A flick of a switch then heats the rod (or all four rods at once, if four heaters are used). After proper amount of expansion has taken place and tie rod nuts are again tightened, the heater is removed, and contraction during cooling tightens the nut's grip on press parts, cinching the entire assembly together so it becomes what is almost a single unit.



WORKER INSERTS last bolt heater in fourth tie rod before turning on heat. Transformer for heaters sits atop press—in this case, a 200-ton unit used for progressive blanking and forming operations on sheet metal electrical parts.

Methods for tie-rod heating:

Gas torches
Steam
Heavy electrical currents passed through rods
Electrical resistance units

Bolt heaters pay dividends in another way too, besides simplifying assembly. They're useful on the press user's shop floor as well, when emergencies occur in the course of day-to-day pressworking operations.

In production shops, overloaded presses sometimes stick on bottom dead center of their stroke. This can prove mighty awkward and every effort is made to prevent its happening. Still, it does happen—and when it does, every bearing and pressure surface, including the dies, is under a terrific compression load.

Getting the press unstuck isn't easy. Engineers of one heavy press builder estimate it would take almost 15 times normal power to move a press from the dead center predicament and get it back into normal operation.

Best way to attempt unsticking the press has been to try and jog the clutch with the flywheel running at full speed. Where this fails to back the press off of bottom dead center, press users usually had to resort to heating with a torch to loosen the tie rods sufficiently to release the dies.

Trouble with torch heating was that generally just one tie rod at a time could be heated. This meant standing around waiting for the rod to cool in order to reshrink, clearly a waste of valuable time if it could be avoided.

All rods heated at once

With the new bolt heaters, all four tie rods are heated at the same time, and when enough strain is released in the rods the press can be jogged off the dead-center possition. Another advantage is that—with the bolt heaters—time lost in waiting for rods to cool will be considerably less, since rods are heated simultaneously, heat distribution is far better, and high temperatures are eliminated.

Thus presses can go back into operation as soon as rods cool, or in, say, one-half to one hour usually. This against maybe a day or two downtime with previous methods.

The 120 v Corox bolt heaters range in rating from 1000 to 15,000 watts, in heated length from one to five ft., and in diameters of 0.438 to 1.324 in. Heater design life is 200 hours.

With new accessories—

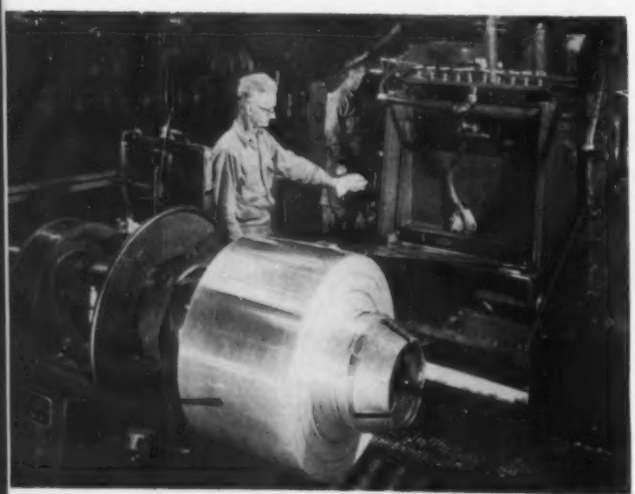
Old Rolling Mills Yield More Tonnage, Better Strip

BEFORE modernization, entry side of No. 5 mill looked like this, involved much manual labor.

◆ Specialty rolling mills handling small orders usually can't afford the latest in roll units, must make old equipment do . . . But they don't have to use antiquated coil-handling methods for the same reason.

◆ Fairmont Aluminum Co. carefully integrated modern upenders, cone-type payoffs, bridle feeds and tension reels to three 30-year old mills . . . Result: estimated 20 pct minimum gain in mill productivity, and better quality strip material.

BY T. J. CONNELL, General Manager, Fairmont Aluminum Co., Fairmont, W. Va.



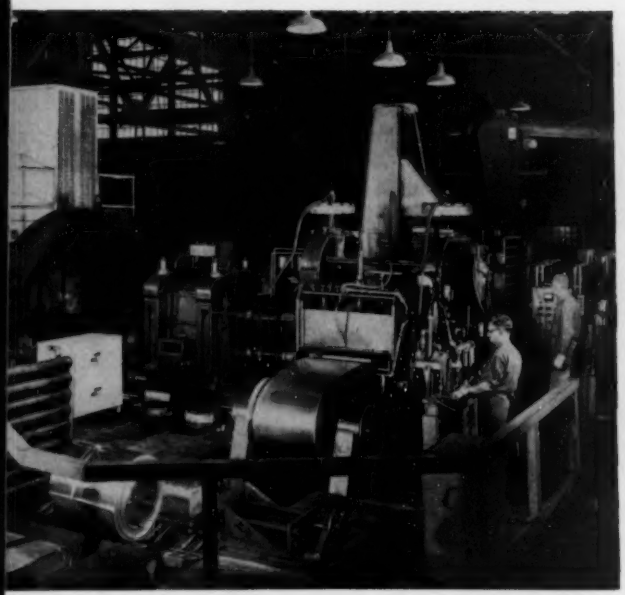
COLLAPSING-mandrel payoff and bridle feed improve quality of strip rolled on No. 7 mill.

◆ PLANTS THAT ROLL nonferrous alloys on a specialty basis frequently can't justify large expenditures for highly mechanized rolling mills. Size of the orders they handle is usually the limiting factor. As a result, mill units are often apt to be hand-fed, single-stand types, with a minimum of auxiliary coil-handling facilities.

Modern equipment for handling coils in and out of mills offers one way for such firms to get production economy, better product quality and much-needed mechanization without the cost burden of brand new rolling mills.

A case in point is the estimated 20 pct gain in output from a modernized line of cold mills at Fairmont Aluminum Co., Fairmont, W. Va. Most of Falco's mills are more than 30 years old. In 1955, the firm shipped more than 25 million lb of aluminum alloy plate, sheet, disks, coiled sheet and strip.

This production record was considered good



AFTER renovation, entry side of No. 5 mill has upender, cone-type payoff, 7-roll bridle feed.

BEFORE accessories were added, 24 in. line for slitting aluminum alloy strip looked like this.

in view of the age and condition of the mill equipment. But management still sought new ways to (1) increase output per man from each mill, (2) speed-up and simplify coil handling, (3) improve surface finish on strip material.

Ultimate decision was to undertake a limited, carefully integrated modernization program. Basically, it involved the three most heavily-used cold mills, also called for modification of a slitter and installation of new slitting facilities.

Coil handling too slow

E. W. Bliss Co.'s Rolling Mill Div., Salem, Ohio, was awarded the job of altering mills and improving slitting operations.

Preliminary study showed that obsolete coil-handling methods caused most of the production difficulties with the three mills. All had loose, arbor-type payoffs, with no provision for winding tight coils or applying tension to the strip.

These loose coils were easily scratched or otherwise damaged in handling. Moreover, constant watchfulness was needed throughout rolling operations to keep gages within acceptable tolerances, and breakage of strip in the mills was a relatively frequent occurrence.

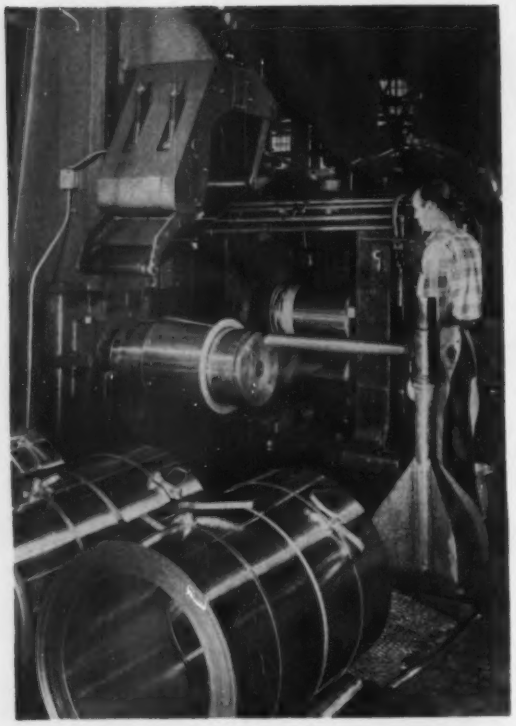
As shown in accompanying photographs, renovation of Mill No. 5 is typical of the modernization applied to all three mills. As it operated formerly, the mill utilized a run-around conveyor table to return coils from the delivery side to the entry side for further passes through the rolls. Handling coils from the end of the table into

AFTER "fixup," 24 in. slitter had new payoff and tension reels, coil buggy for payoff reel.

rolling position and inserting strip ends into rolls was done manually. On the delivery side, the mill had a three-roll upcoiler.

As renovated, the mill still retains the U-shaped conveyor table. In addition, there is now an upender on the entry side. Between the upender and the mill is a new cone-type payoff. Thus, positioning of coils for rolling is completely mechanized.

With the new setup, strip is not fed directly



DELIVERY side of modernized No. 6 mill features new tension reel and a vertical belt wrapper.

into the mill rolls; a seven-roll bridle feed centers it accurately, holds it in position and maintains back tension during rolling. Delivery side of the mill is fitted with a collapsing tension reel capable of exerting an 11,000-lb pull on the strip.

The tension reel is supplemented by a new belt wrapper, plus an upender that positions coils for the conveyor trip to the entry side of the mill. To add another modern touch, Bliss is building motorized screwdowns to replace existing hand operated units.

Mills get "new look"

Mill No. 5 is a 20 x 44-in., 2-high unit for rolling gages between 0.125 in. and 0.025 in., in widths up to 36 in. Renovated also was Mill No. 6, a 2-high, 16 x 30-in. unit used for the same range of gages in narrower widths. Its new entry and delivery equipment duplicate that of Mill No. 5, except for limits on width and the fact that no upenders are used.

Mill No. 7, for rolling gages down to 0.006 in., was modernized in a manner similar to No. 6. However instead of the cone-type payoff which the other two units have, No. 7 uses a collapsing mandrel to preserve and protect the last wraps of these thin-gage materials.

Estimate is that these modernized entry and delivery facilities have raised potential capacity of the individual mills by a minimum of 20 pct, to say nothing of the marked improvement in product quality.

At least part of this increase stems from the fact that the new Bliss tension reels permit greater reduction per pass than the old setup. Plant superintendent G. B. Artman reports being able to go from a former maximum of 20 pct per pass to 32 pct or more at present.

In addition, damage to the strip surface is almost eliminated in the tight, smooth coils wound by the new tension reels. And, of course, much heavy and somewhat hazardous manual effort is now accomplished entirely by means of machinery.

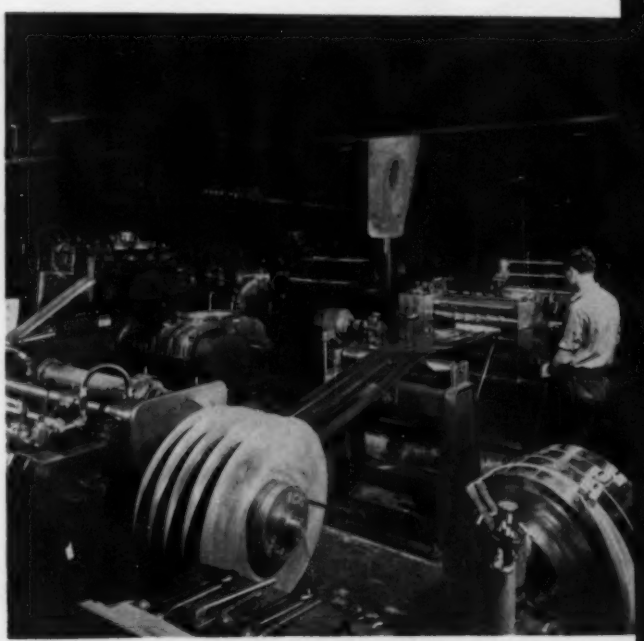
Fix slitting lines, too

Other Bliss coil-handling equipment has been added to Falco's 24-in. slitting line, including new payoff and tension reels, and a coil buggy to expedite handling at the payoff reel.

Actually, former slitting capacity is now more than doubled due to the installation of a complete new slitting line which takes up to 12 cuts in material 0.020 in. thick and 28½ in. wide.

But the new slitting line is the only complete unit of production capacity added as part of the modernization project. All other items were carefully planned to improve the productivity of existing equipment. Success of the renovation program is already obvious; time and full-capacity operation will establish the exact degree of overall improvement.

Encouraged by results of the project thus far, the mill's management plans to modernize other "bottleneck" areas, also.



ALL new 28-in. slitting line takes up to 12 cuts in 0.020-in. thick sheet at 300 to 600 fpm.

ACME-NEWPORT STEEL COMPANY

Newport, Kentucky

EFFECTIVE September 14th, 1956, the property and facilities formerly owned and operated by the Newport Steel Corporation, are now owned and will be operated by the Acme-Newport Steel Company, a wholly owned subsidiary of Acme Steel Company, Chicago, Illinois.

Acme Steel Company has been in business for 76 years and produces hot and cold rolled strip steel at its Riverdale Mill adjacent to Chicago. Our Company has developed a substantial business in special steel products such as Steel Strapping—Stitching Wire—Container Hoops—Floor Plate—Dexion Slotted Angle—Galvanized Flexible Conduit and other specialty products.

Acme-Newport Steel Company will continue to produce its present line of products. These will eventually be augmented by more steel specialties.

Present Newport Steel management will continue to administer the business with A. P. Miller as Vice President and General Manager, and Carl M. Riefkin as Vice President in Charge of Sales.

The consolidation of Acme Steel and Newport Steel brings many advantages to both companies and holds promise for more flexible application of their combined facilities to better serve users of steel throughout a broad range of industries.

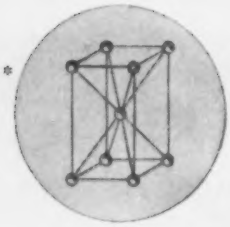
Acme Steel Company, through its subsidiary the Acme-Newport Steel Company is happy to become part of the great Ohio Valley community and looks forward with confidence to participation in the growth and development of this prosperous area.

We welcome into the Acme Steel family all the present employees of Newport Steel. Their cooperation is sought in making this affiliation a successful enterprise . . . an enterprise which will result in benefit and security for our employees, our customers, the community of which we are a part and our thousands of shareholders.

Carl J. Sharp,
Chairman of the Board, Acme Steel Company

Frederick M. Gillies,
President, Acme Steel Company

ACME STEEL COMPANY, *Chicago, Illinois*



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New Technical Literature:

Catalogs and Bulletins

High pressure tube

Very high pressure tubing is designed for safe service at pressures up to 100,000 psi. So states a new data memorandum. The tubing is supplied either as heavy single or as double wall tubing. Composite wall tube is made by drawing a larger tube over a small one, establishing a mechanical bond between the two. It is furnished in ten standard sizes from ⅛ to ¾ in. outer diameter in increments of 1/16 in. A table lists maximum wall thickness for each size and gives minimum bursting pressure for single wall tubing in each od size and wall thickness. Minimum bursting pressures for composite tubing are slightly higher. Also included are seven formulas most generally used or cited for determining stresses. *Superior Tube Co.*

For free copy circle No. 1 on postcard, p. 113

Fittings, flanges

Engineers, buyers and estimators whose duties require them to be familiar with welding fittings and flanges are expected to be very interested in a new six-page folder. It describes briefly but completely a firm's full line of carbon, alloy and stainless steel seamless welding fittings and forged steel flanges. *Tubular Products Div., Babcock & Wilcox Co.*

For free copy circle No. 2 on postcard, p. 113

Welder

Magnetic force welders are covered in a six page publication. Bulletin points out advantages of magnetic force welding to join difficult-to-weld, critical materials. It says light initial electrode pressure permits projection welding on materials whose projections would collapse under conventional electrode pressure. *Precision Welder and Flexopress Corp.*

For free copy circle No. 3 on postcard, p. 113

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

No-corrode pipe

Fabrication techniques and technical information on applications of nickel lined pipe and fittings are included in a new eight page booklet. Photomicrographs illustrate the pore-free adherent characteristics of the pure nickel lining. A seperate section is devoted to welding procedures and general fabrication techniques. Literature also features information on successful applications. *Bart Mfg. Co.*

For free copy circle No. 4 on postcard, p. 113

Batteries

Advantages of the positive-plate design of a new line of batteries for stationary power services are described in a new folder. Photographs show how spiral buttons of one type plates provide a reserve supply of lead and a working area more than five times the plane surface of the plate. Long battery life in utility, telephone, railway signaling and switching and industrial plant applications is claimed. Illustrations show: (1) rolled, corrugated lead strips permitting free penetration of electrolyte to the heart of positive plates for high battery capacity, and (2) horizontal shelves of the plates which retain active material against the forces of gravity and electrolyte turbulence. *Exide Industrial Div., The Electric Storage Battery Co.*

For free copy circle No. 5 on postcard, p. 113

Synthetic rubber

Chemical resistance of a synthetic rubber material is covered in a newsletter. It tells how the rubber industry tests and evaluates physical and chemical properties of elastomers. No standard tests for chemical resistance have been established, it says, because of varying conditions; actual performance of each compound must be tested. General chemical resistance of neoprene is described. References are made to more detailed resistance tables. *E. I. du Pont de Nemours & Co.*

For free copy circle No. 6 on postcard, p. 113

Industrial trucks

Materials handling trucks are covered in a 132 page catalog. For easy reference it is indexed into five categories. Two sections are devoted to riding-type electric and walkie electric fork trucks. Photographs show trucks in operation. Descriptive pages outline specifications and construction features. Stakers and cranes are described in a special section. Illustrations show them in operation. Handlift and floor trucks are covered in the final sections. *Lewis-Shepard Products Inc.*

For free copy circle No. 7 on postcard, p. 113

Alloys

Phosphor bronze, nickel silver, beryllium copper and cupro nickel are reviewed in a 36-page booklet on one company's alloys. Well illustrated, the literature devotes several pages to each of the metals, their applications and specifications. A brief history of the company from which they are available also appears. A handy dictionary of copper terms is included. Still another page explains the word "Temper." Colorful, easy to read charts give decimal equivalents, gage number equivalents, sheet weight (according to gage in pounds per sq ft; according to thickness in pounds per sq ft), weight of rod and wire weight. How to order, the company's delivery service and district sales offices bring the book to a close. *Riverside Metal Div., H. K. Porter Co., Inc.*

For free copy circle No. 8 on postcard, p. 113

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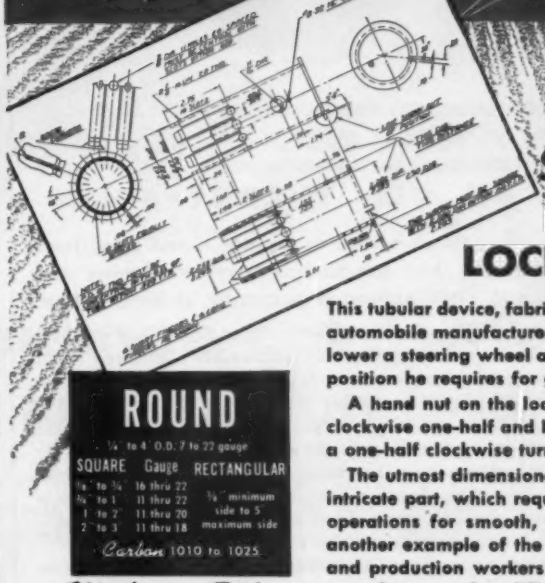
Electric Resistance WELDED
STEEL TUBING
Always makes possible Better products at lower Cost



ROUND
1/8" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
1/8" to 3/4"	16 thru 22	
3/8" to 1"	11 thru 22	1/8" minimum side to 5" maximum side
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Automotive Steering Wheel HEIGHT LOCKING DEVICE

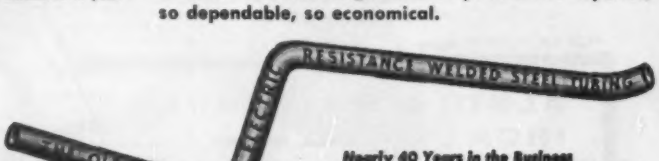
This tubular device, fabricated by Michigan for a major automobile manufacturer, enables the driver to raise or lower a steering wheel and lock it into the exact elbow position he requires for greatest driving comfort.

A hand nut on the locking sleeve is turned counterclockwise one-half and locked at the desired height by a one-half clockwise turn.

The utmost dimensional accuracy is required for this intricate part, which requires a multiplicity of exacting operations for smooth, reliable functioning. It is still another example of the ability of Michigan engineers and production workers to meet the needs of product manufacturers for difficult tubing fabrications produced in volume at low cost.

You are invited to check the dimensions in the drawing at the left. It illustrates the type of problems that our engineering staff is always prepared to solve for Michigan customers.

We will welcome the opportunity to place at your disposal the many years of design and production skills that make Michigan tubular products so superior, so dependable, so economical.



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...that all castings had to be big, thick and sometimes cumbersome... had to undergo heavy machining and finishing to even approach accuracy of specfication.

Not so today! The Warheads* are another interesting example of how Albion's resin *shell casting* process has eliminated much of the casting-finishing cost...and, permitted broader utilization of ferritic and pearlitic malleable irons.

As an example, both the castings above appear to be the same *on the outside*...and both are of the same material. Yet, one is far lighter, thinner-walled and accurate... requiring far less machining, finishing time. Another positive proof that Albion's *resin shell* casting process permits closer tolerances, less excess metal—resulting in savings from the laboratory through finishing.

Albion's ferritic and pearlitic malleable irons can be cast to your exacting specifications with physical properties to suit your needs.

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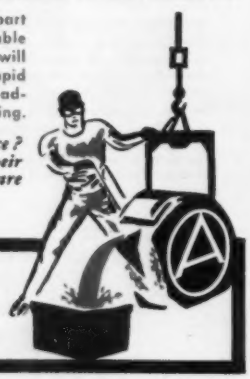
*155 MM Projectile Ogive



ALBION MALLEABLE IRON CO. Albion, Michigan

FREE LITERATURE

Tramrail cranes

Motor-driven cranes featuring fluid drive are subjects of a new four-page bulletin. These cranes are described in text and illustrations, including an engineering drawing and a data chart. Advantages listed are: longer wear, better performance, low maintenance cost and greater durability. Even acceleration and sustained operation smoothness results from the fluid drive application, the bulletin says. Both motor and crane are protected from extreme shock. *Philadelphia Tramrail Co.*

For free copy circle No. 9 on postcard, p. 113

Surface plate

Instructions for surface plate calibration after it has been installed in a user's plant are told in an article published by a leading surface plate manufacturer. Since measurements are no more reliable than the surface plate on which they are referenced, company says, it is important to know exactly the accuracy of the plate being used. An auto-collimator and the manufacturer's instructions, are said to be sufficient media to allow highly accurate calibration. Even semi-skilled personnel can do it, using instruments available at any industrial laboratory, the manufacturer states. Titled "How To Calibrate Surface Plates In Your Plant," the article is written by J. C. Moody of the Sandia Corp. *Collins Microflat Co.*

For free copy circle No 10 on postcard, p. 113

Millivoltage measurer

Concise information about electronic potentiometer-type indicators, recorders and controllers is given in a two page data sheet. They are calibrated directly in millivolts: −5 to 0 to +5 mv, 0 to 10 mv, or 0 to 50 mv. Sheet lists features and specifications of the indicators and recorders. It also presents a condensed tabulation of instrument characteristics for control applications ranging from simple two-position to full-proportioning control. *Leeds & Northrup Co.*

For free copy circle No. 11 on postcard, p. 113

Maintenance cut 49% with SKF® anti-friction bearings

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FREE TECHNICAL LITERATURE

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This section starts on p. 108.

Tools and drills

One company's complete line of tools are listed in a new 206 page book. Preceding each major section of the catalog are full page 8-½ x 11 in. black-and-white action photos of typical tools in the respective sections. Step-cut thumb-indexing, with colored tabs, makes it easy to locate each of the 14 main sections. The tools in each section are conveniently grouped for quick reference. Illustrated and listed in this catalog are 29 new tools. *Cleveland Twist Drill Co.*

For free copy circle No. 12 on postcard

Motors

Construction features of large end-shield bearing synchrononus motors are described in new literature. Motors meet growing demand for high degree of protection, combined with maximum accessibility for a variety of direct-connected or geared applications, it says. *Allis-Chalmers Mfg. Co.*

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Epoxy resins

Company has just published a complete chart of formulated epoxy resins giving physical and electrical data on 27 resin systems. Included are room temperature set, heat cured, filled, unfilled, resilient and rigid resins. Also noteworthy is the multiple choice of hardener for several epoxy resin systems—offering fast or moderate cure—with and without safety hardeners. Requirements of key electronic companies and electronic divisions of aircraft and guided missile manufacturers are being fulfilled by the materials described on this chart. *Furane Plastics, Inc.*

For free copy circle No. 14 on postcard

Corrugated boxes

What carrier regulations influence the shipment of products? How do you determine the type and nature of a package? What specific kinds of corrugated board are available? The answers to these and other questions about corrugated boxes are found in a newly-revised edition of a company phamphlet. Packed with up-to-the-minute information, the booklet provides a convenient check list to determine specifications for better corrugated boxes. *Hinde & Dauch.*

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Lehr belts

Belts for glass annealing and decorating are described in a new folder. It describes special design features of the belts. These promise the user improved operation and longer service life with less maintenance and lowered operating costs. Supplied either in high carbon or chrome steel, they are described as strong and corrosion resistant. It says they will withstand natural wear and tear encountered in all operations, even at high temperature and increased belt speed. *Colorado Fuel and Iron Corp.*

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Tapping

Basic information on taps, their uses and descriptions are contained in a 72 page pocket size tap primer. Information is given in simple terms. Illustrated throughout with drawings and photos, the primer step by step explains tap and thread terminology. *Threadwell Tap & Die Co.*

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FREE TECHNICAL LITERATURE

Warehouse truck

Specifications on a 4000 lb capacity warehouse truck are included in a bulletin. The truck was recently added to one company's line of rider straddle type industrial lifts. Literature contains key features of the equipment in addition to engineering data. They are available in capacities of 2000, 3000 and 4000 pounds. *Yale & Towne Mfg. Co.*

For free copy circle No. 18 on postcard

Raceways

An installation guide for plastic-coated raceways contains progressive illustrated installation details recommended for obtaining maximum protection and efficiency from plastic-coated rigid steel conduit and electrical metallic tubing. *General Electric Co.*

For free copy circle No. 19 on postcard

Synthetic lubricants

Government-specified synthetic lubricants are now available to industry in quantity. A booklet covering these announces their availability, advantages and applications. Oils, greases, rust preventives and damping fluids are reviewed in attractive photo-chart form. A full page graphically explains evaporation characteristics and viscosity temperature characteristics of synthetic instrument oil vs. petroleum instrument oil. *Lehigh Chemical Products Co.*

For free copy circle No. 20 on postcard

Precision balls

Precision ball manufacturer has announced the availability of new literature on its complete line. Brochure shows specifications for balls of various sizes, grades and in materials ranging from stainless steels to non-metallics such as ceramic, sapphire and plastic. Included is information on: chrome alloy steel balls; instrument grade balls: precision miniature balls; balls for oil tools, bronze, or beryllium copper balls; monel balls; aluminum balls sintered carbide balls; high temperature steel balls; stellite balls, and other special items. *Universal Ball Co.*

For free copy circle No. 21 on postcard

Mill bearings

Complete line of catalogued heavy duty mill bearings available to industry is described in a book just published. They have heavy duty, self-aligning roller bearings and steel housings. Complete line for shaft diameters ranging from 2 7/16 to 11 in. is described in the eight page book. It includes dimension and rating data. *Link-Belt Co.*

For free copy circle No. 22 on postcard

Evaporation preventers

Polyethylene pillows reduce evaporation of liquids in open vessels up to 70 pct, a new catalog sheet says. Literature points out that the pillows are in essence, small floating tank covers, 1.1 lb of which cover 1 sq ft of surface area with a 1½ in. thick layer. Pillows have virtually unlimited life, it says. They are chemically inert to almost all reagents, light in weight, low in cost, and are non-contaminating. They are ⅝ in. od by 1¼ in. by ¼ in. Both ends are sealed after air has been introduced for added buoyancy. Illustrations show design and application. *American Agile Corp.*

For free copy circle No. 23 on postcard

Phosphating

Detailed phosphating folders cover a company's entire line of phosphating and metal protective coating materials. A portion of this folder is devoted to a general discussion of phosphating. Included are diagrammatical cross-sections of how phosphating works, application photographs and a discussion of the use of coating materials as bonds for paint, as bonds for other organic finishes, as anti-friction coatings and as agents to protect unfinished metals from corrosion. Also featured is a phosphating reference chart. This describes the purpose and make-up of each coating type, recommended uses, applicable government specifications, methods of applications, equipment requirements, metals that can be coated, coating weights and basic operational cycles. *Turco Products, Inc.*

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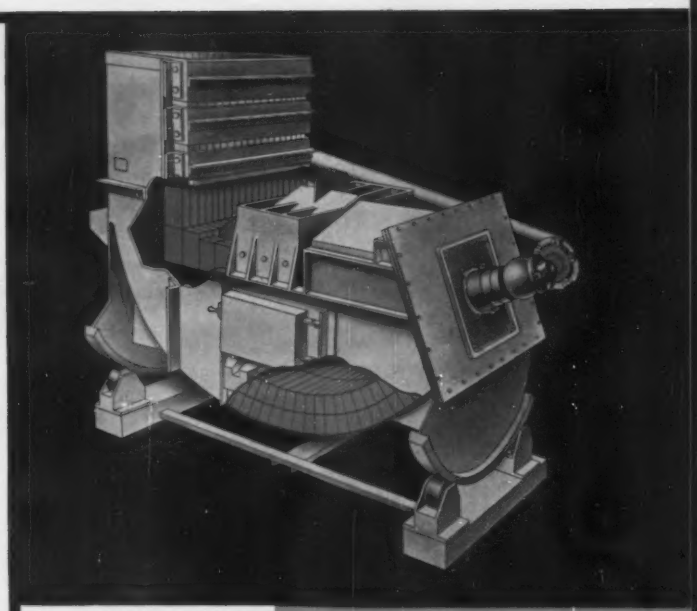
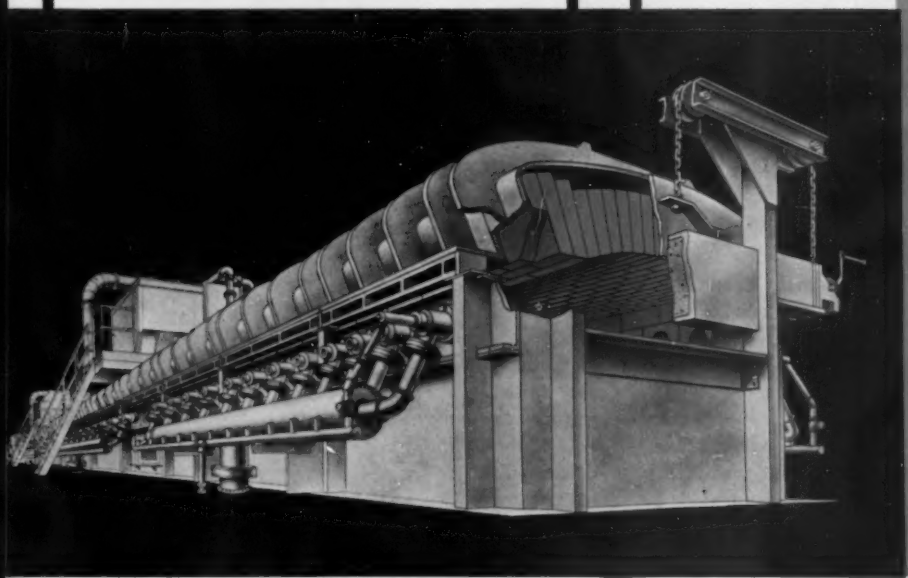
Why B&W Allmul Firebrick withstand punishing service in furnaces like these



Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

They are practical from a cost standpoint for a wide range of applications in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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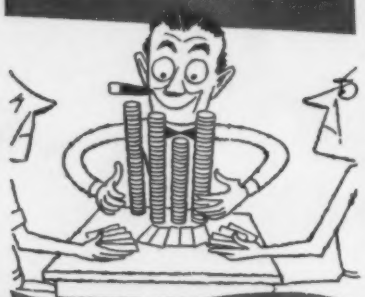

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RESEARCH: Surface Defects

Cutting, grinding and polishing produce an undesirable layer of disturbed material on the surface of solids . . . Now semiconductors' layer thickness can be determined.

Surface and structural defects in solids, with their large influences on mechanical behavior, often have defied detection by previously available techniques. However, in work with semiconductors, such defects can in many cases be readily identified through their electrical influences. One of the more recent examples comes from the electrical studies of the surface perfection of germanium carried out by T. M. Buck and F. S. McKim at Bell Telephone Laboratories, Murray Hill, N. J.

Cutting "Disturbs Material"

Cutting, grinding, and polishing produce an often undesirable layer of "disturbed material" on the surface of solids which chemical and physical studies have repeatedly revealed. Thickness of this damaged layer has, in the past, been difficult to determine. Recently a new technique has been devised for evaluating the depth of damage. This technique is based on the "photomagnetic-electric effect" which has been studied extensively in a number of laboratories both in this country and abroad. An improved theory of this effect, developed by W. van Roosbroeck of Bell Laboratories, has made possible the quantitative interpretation of the experiments reported here.

Photomagnetoelectric Effect

The "photomagnetoelectric effect" in semiconductors occurs in the following way: When the front surface of a piece of germanium is illuminated by light that is highly absorbed at the surface, excess pairs of oppositely charged carriers, electrons and holes, are produced. These normally diffuse straight through the sample, recombining somewhere in the interior or at the back surface. However, if a magnetic field is applied parallel to the surface, it causes electrons to curve in one direction and holes in the opposite. This creates a type of Hall-effect voltage difference, the photomagnetoelectric potential, between two electrodes on the back surface along a line normal to both magnetic field and diffusion current.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Researchers measure photomagnetoelectric effect.

Carriers Rapidly Recombine

The excess carriers recombine more rapidly at a damaged front surface. Thus, the concentration

gradient and diffusion current across the slab are smaller when damage is present, as is the voltage along the slab; the measured voltage increases with increasing perfection of the illuminated surface.

In the Bell Laboratories' studies, the sensing electrodes for the photoinduced voltage are permanently affixed to the sandblasted back surfaces of thin slabs of germanium. The magnitude of the voltage is determined while the character of the front surface is systematically altered. As disturbed material resulting from abrasion is progressively removed by chemical etching, the voltage increases to an asymptotic limiting value. The measured depth below the original surface at which this limit is reached reveals the thickness of the damaged layer.

Similar Measurements Made

The "surface recombination velocity" of the excess carriers is also obtained from similar measurements. This is the velocity at which holes and electrons diffuse into the damaged surface layer and recombine in it; and it is, therefore, a measure of the extent of surface damage. This velocity has been found to range from 30,000 cm per second for abraded surfaces to about 100 cm per second for relatively undamaged ones, and decreases rapidly as the outermost portion of the damaged layer is etched away.

Damage 35 Microns Thick

It has been found that sandblasting or lapping with relatively coarse abrasives leaves a damaged layer as much as 35 microns thick, while polishing with very fine abrasives disturbs a layer of only one or two microns. Over a broad range there is a clear correlation between the size of the abrasive particle and the depth of damage. Even microscopically undetectable damage due to momentary immersion of a "perfect" surface in an ultrasonically agitated water suspension of 600

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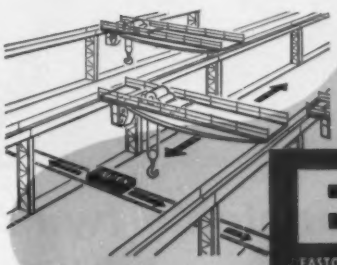

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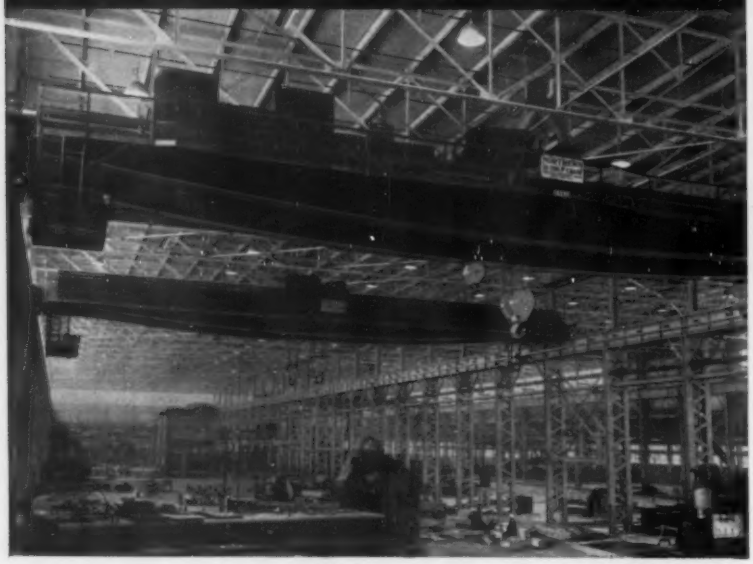

these notable twins assure dependability

LOCATION Press bay of a large, new plant manufacturing rear axle parts and components for automobiles and trucks.

SPAN 96 feet 10 inches, centers of runways.

CAPACITY 30-tons on Main Hooks, 10-tons on auxiliary hooks.

ELECTRICAL EQUIPMENT 60-HP motors on Main Hoist, Auxiliary Hoist and Bridge Travel, and 15-HP motor on Trolley Travel, with full magnetic control and direct current on brakes.

ADVANTAGES These twin NORTHERN cranes serve twin heavy press lines located at each end of the press bay. Designed for heavy duty requirements with compensating type bridge end trucks, and equally suitable electrical equipment and controls, they dependably and safely speed machinery installation or relocation, and assure smooth, uninterrupted flow of work in today's and tomorrow's automated production.

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NORTHERN MATERIAL HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

mesh abrasive appears to extend to a depth of about one micron.

Other Studies

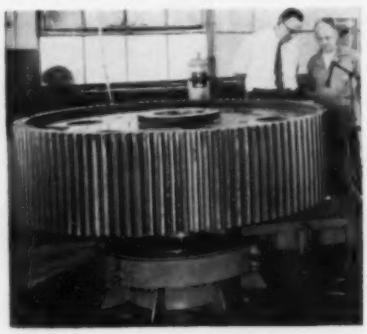
Surfaces damaged by bombardment with high energy ions are also being studied by this technique. In addition, it appears probable that these studies, at present confined to semiconductors, may be broadly significant because of the insight they seem capable of affording into surface damage of solids in general.

Heat Treating:

Machine easily induction hardens big gears

Both spur and helical gears in diameters up to 157 in. and face widths up to 20 in. are induction-hardened with ease with new facilities recently installed at one company.

Purchased in Europe and the first to be set-up in this country, the machine offers other advantages besides capacity to harden



Unit induction-heats spur and helical gears to 157-in. diam.

teeth of gears in a great range of sizes. It is presently in use at the Farrel-Birmingham Co., Inc., Ansonia, Conn., plant.

It differs from most gear-hardening units in its ability to produce a case contour with the best combination of durability and bending strength.

Gets Consistent Results

Pitches from 5 dp to 0.75 dp can be handled and, in addition to the machine's flexibility, it produces

consistent results. Test pieces, as well as a number of production gears, indicate this. All portions of all teeth of a group of similar gears will have exactly the same predetermined case contour, depth and hardness. This is accomplished, in part, by reducing human factors through the use of several effective and modern control features.

Future Improvements

With the use of this equipment, Farrel - Birmingham anticipates the possibility of notably improving load-carrying capacity in relation to gear size without excessive cost.

Cleaning:

Automated blast cleaning increases output

Foundries, forge-shops, heat-treating plants and other metal-working factories which must clean and descale parts in large volume are making use of a fully-automatic blast cleaning unit. All operations of the blaster, including material handling, weighing, starting and stopping the rotation of the barrel are automatic.

Parts Cleaned, Descaled

In a large operation with high volume, several of the units are grouped in a line receiving dirty castings from the shake-out by way of a conveyor feeding the loading skip at each machine. After the cleaning cycle, one common conveyor serving all the barrels in the group takes the clean, descaled parts to the next operation.

Automatic Feed Stop

The detailed cycle of operation begins with the loading of the skip by the incoming conveyor. When a load of predetermined weight is in the skip, a switch automatically stops the feeding conveyor. When the blasting cycle in the barrel is completed and the load discharged, the skip is automatically raised which

IN ADDITION TO ITS REGULAR LINE of precision gears, one of New England's oldest and ablest gear-engineering organizations is now fully equipped to produce fine pitch gears to your own specifications. Any size and quantity... any type of basic material, metallic or non-metallic. Complete heat-treating facilities.

Perkins has the equipment, the experience and the craftsmen to satisfy *all* of your custom-made gear requirements.

YOU FURNISH THE SPECIFICATIONS — WE'LL PRODUCE THE GEARS

PERKINS MAKES: bevel gears, ratchets, sprockets, ground thread worms, helical gears, spiral gears, spur gears-shaved or ground teeth, gear trains and assemblies, speed reducers.

* The **PERKINS PRECISION SPRING COILER** is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7 1/2x16". A POWER MODEL is available. Information on request.

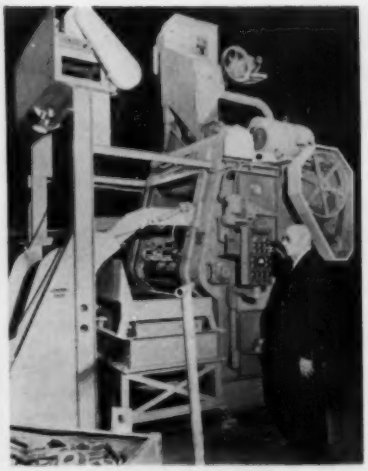
PERKINS MACHINE & GEAR CO.
103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS

dumps the dirty castings into the barrel. The skip returns to the loading position and is immediately filled with another load of dirty castings. The door of the barrel shuts, the barrel begins to rotate, the blast wheel begins to throw abrasive.

Cycle Changes Quickly

After a predetermined period, the wheel stops and a short period of tumbling takes place, to drain abrasive from work. The barrel stops, the door opens, barrel reverses direction, and the cleaned castings are dumped out of the barrel onto another conveyor which takes the castings to the next step in processing. The skip dumps in a new load and the cycle is repeated. Manufacturer of the unit is the Pangborn Corp., Hagerstown, Md.

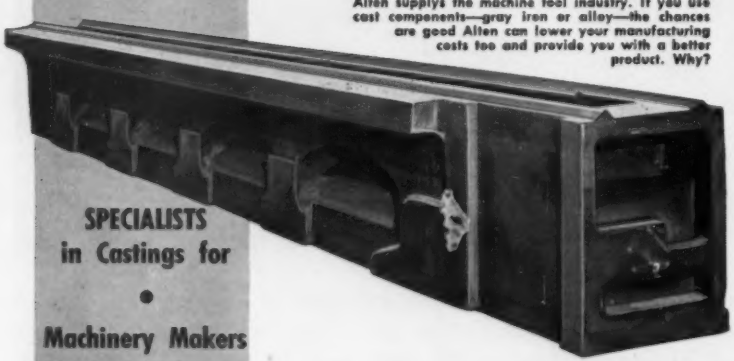
All of the steps in the cycle are controlled automatically. However, the blasting cycle can easily be changed in a matter of seconds, length to suit cleaning time required.



Push-button board can provide separate control if desired.

Machine Tool Makers use ALTEN CASTINGS for jobs like this..

This lathe bed is typical of numerous castings which Alten supplys the machine tool industry. If you use cast components—gray iron or alloy—the chances are good Alten can lower your manufacturing costs too and provide you with a better product. Why?



SPECIALISTS in Castings for

- Machinery Makers
- Manufacturers of Earth Moving Equipment
- Engineering and Construction Companies

If You use castings . . .

Advance techniques employed by Alten result in extra qualities you don't pay for. These include: greater strength and rigidity, abrasion and corrosion resistance, closer tolerances, increased vibration absorption, more durability, etc.
So, if you use custom castings, please drop us a note—we'll be glad to quote on your requirements. Our machining facilities may be of interest, too.

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200 West Wheeling St., Lancaster, Ohio

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Handling:

Vibrator delivers stampings free of slugs, chips

In this day of automation and electronic brains the solution to a tough production problem is frequently thought of in terms of costly specialized equipment. A little "gadgeteering" can sometimes do a better job, though.

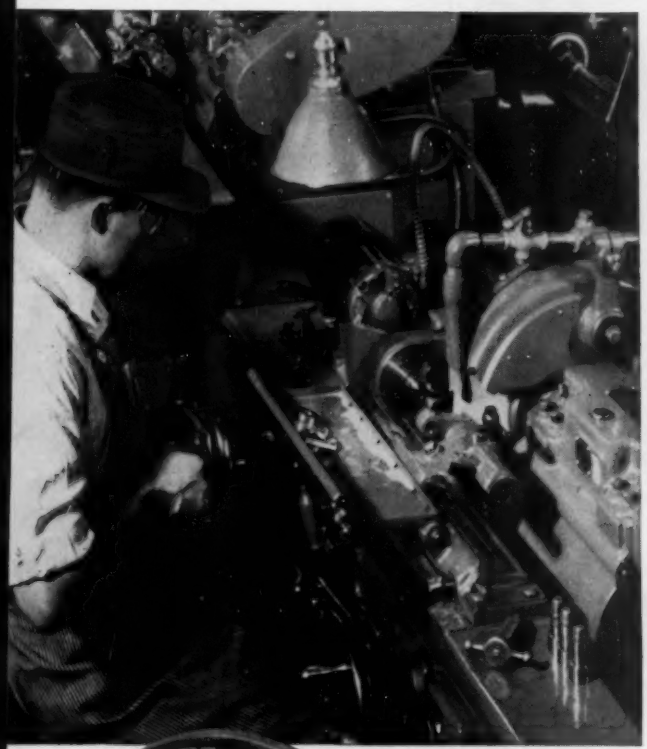
It is extremely important to Krasberg & Sons, Chicago, who manufacture precision stampings, that their finished stampings be delivered free of slugs and chips. The sorting and cleaning of stampings was a time consuming, hand job until an employee got a brain storm.

Frame Is Spring Mounted

Instead of handling each piece, he decided to build a vibrating screen that would shake the slugs from hundreds of stampings in one operation. Using several feet of Dexion slotted angle, a handful of bolts, and a Cleveland air vibrator, he had a table built in his own shop at a cost of less than $125 for materials.

Free shaking action initiated by the vibrator is achieved by

Sterling "sixth element" grinding wheels ...tailor-made to your job requirements



GRINDING WHEELS must be tailored exactly to your job requirements. To deliver top performance, they must combine, in just the right proportions, the five standard elements of a grinding wheel formula—abrasive grain, size, grade, structure, and bond. But in formulating *your* grinding wheel, Sterling also considers a *sixth element.*

The sixth element is the *human* element: the operator, his work habits, personal preferences, and all the other factors which can so greatly affect wheel performance. Sterling engineers know how to isolate this sixth element, then use it to produce a wheel tailored to the metal . . . the machine . . . and the man.

Because Sterling wheels are always formulated with the sixth element in mind, they can lower your grinding costs by prolonging wheel life, speeding grinding operations, and reducing downtime. For a thorough study of your grinding operation, call in a skilled Sterling abrasive engineer, or contact your nearest Sterling distributor.

For fast, repetitive work, such as this cylindrical grinding operation, a job-tailored Sterling grinding wheel will help you maintain production schedules, with minimum wheel consumption and maximum economy.

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USE SAFETY GUARD - SEE A.S.A. SAFETY CODE
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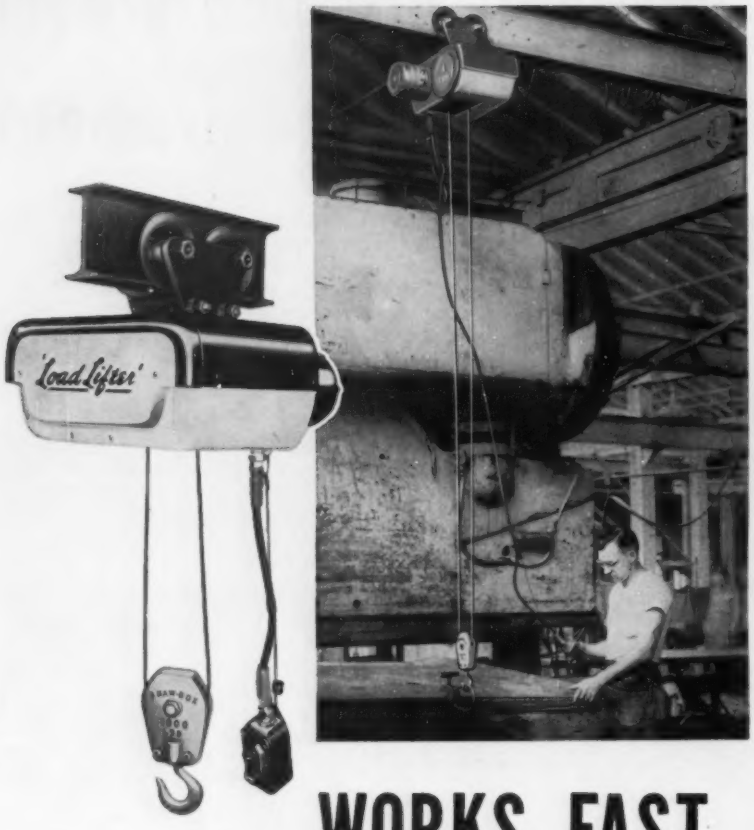
STERLING GRINDING WHEEL CO.
TIFFIN, OHIO

"Wheels of Industry"—Vitrified and Resinoid —to meet the exact requirements of industry.

STERLING GRINDING WHEELS

"THE WHEELS OF INDUSTRY" STERLING

STERLING GRINDING WHEEL CO., TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY



WORKS FAST

TO HOLD DOWN PRODUCTION COSTS

A fast, rugged hoist is a "must" wherever loads up to a ton are lifted often in production. The Series "600" 'Load Lifter' Electric Hoist fills the bill exactly! A ½-ton load can be lifted at 30 FPM speed. The hoist has *two* automatic brakes that work together. This feature, plus handy push-button control, assures the quick action needed to "spot" loads accurately. And, the flexible wire rope saves time on narrow-angle side lifts.

Get more lifts per hour into *your* load-handling operations. Do it with the cost-cutting Series "600" 'Load Lifter' Electric Hoist. It has safe 24 volts at the push button and every other practical safeguard for man, load and hoist. Capacities: ½ and 1 ton. All types of suspension available to give you the utmost in efficiency and economy. Ask your "Shaw-Box" Distributor for details or write us for Bulletin 408.

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'Load Lifter'® ELECTRIC HOISTS

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

mounting the screen frame on eight coil springs. The screen itself fits loosely in the framework and is easily lifted out so that different sized screening may be substituted for varying sized slugs and stampings. The table, which

This vibrator saves the firm an estimated 60 man hours a week.

is 40x40x36 in. overall, has a hopper bottom that dumps the slugs directly into a scrap box.

Every stamping produced by the company is now cleaned without special handling. It is estimated that the setup saves 60 man hours a week, and plant output is no longer limited to the speed of the cleaning gang.

Machining:

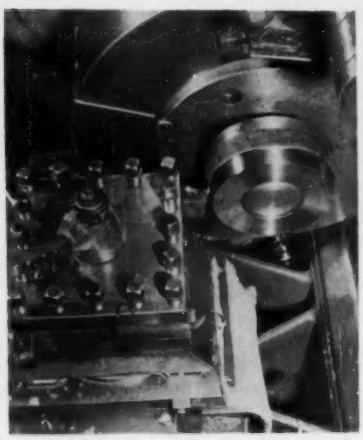
Carbide tool switch reduces costs

Tool costs have been reduced to about one-tenth of former costs in the machining of 7-in. diam forged steel tapered rollers by the Koehring Southern Co., Chattanooga, Tenn. Machining time has been cut to less than one-third of the time formerly required. The tool saving was achieved by a change in the type of carbide tools and does not include additional savings that are realized from the increased production rate and elimination of tool regrinding costs.

Throw-away Inserts Used

Use of Kendex tooling with square "throw-away" button in-

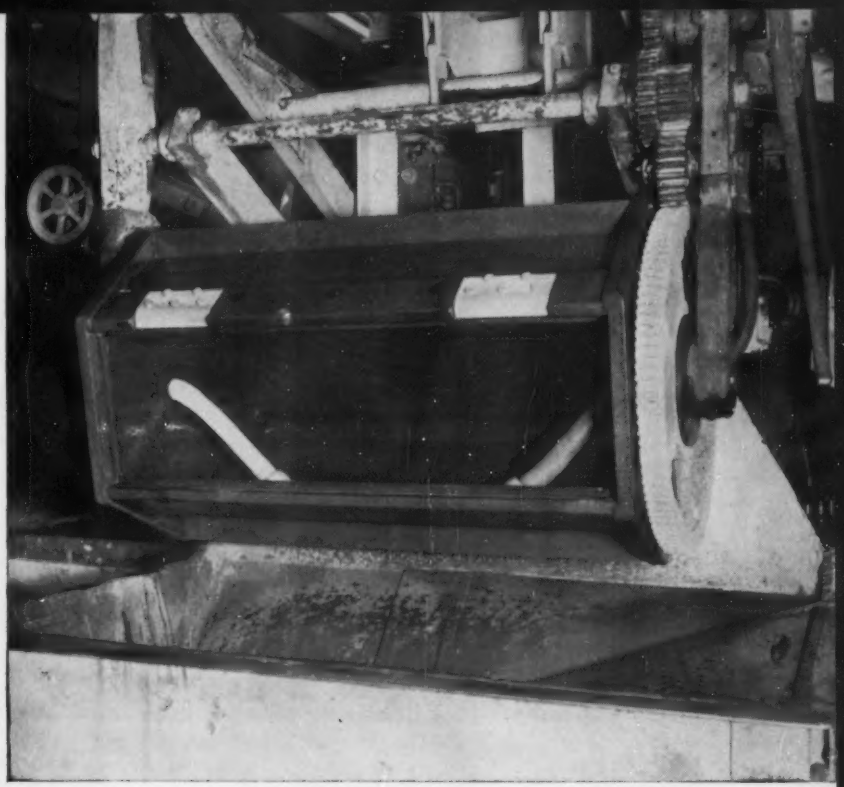
serts having eight cutting edges gave these advantages over standard style GR and GL brazed tip carbide tools. The clamped insert tooling made by Kennametal, Inc., Latrobe, Pa., permitted an increase in machining speed from 353 to 620 sfpm with feeds stepped up from 0.012 in. to 0.016 in. for turning and from 0.006 in. to 0.020 in. for facing. Depths of cut were the same as before, ⅛ in. for turning and ¼ in. for facing. As a result the machining time was cut from 2.69 minutes to 0.73 minutes per piece.



Insert life is 58 pieces per cutting point on turning operations.

The machining operation consists of turning a 7° 40′ taper on a 2.75-in. long forged roller surface which is 6¼ in. in diameter on one end and 7 in. in diameter on the other end, and facing the smaller side. SAE 1045 steel of 240-270 Brinell hardness is used in the roller.

Insert life is 58 pieces per cutting point on the turning operation and 80 pieces on facing. Since eight cutting edges are available on each square insert, the total insert life is 464 on the turning operations and 640 for the facing operations. With brazed tip tungsten carbide tools the average number of pieces per tool grind was 10.3 turned and 7 faced. With ten grinds available, the total tool life was 103 for turning and 70 for facing.



THE BEST BARREL CYLINDER EVER MADE

After 13 Months Of Three-Shift Usage This Udylite Tempron Cylinder Shows Little Wear

This unretouched photograph shows a Udylite Tempron Barrel Cylinder which has been in use for thirteen months, most of the time in a "round the clock" operation. This cylinder looks like new.

Seams are tight and there is no warping although it has processed thousands of heavy loads of work through a complete cycle of *electro-clean, acid pickle, zinc plate, bright dip* or *dichromate* and *hot* and *cold rinses.* Most of these loads have been beyond our guarantee of 200 pounds per 14″ x 30″ cylinder.

In January, 1955 and after two years of exhaustive tests, Udylite formally introduced the Tempron Barrel Cylinder as the most efficient and long lived plating barrel ever offered. The vitality of Tempron and the durability of Udylite construction has now been convincingly proven in hundreds of operations.

During a recent twelve month period, a set of Udylite Tempron Barrel Cylinders has processed millions of pounds of work, mostly through the complete zinc cycle. Any measurement of wear is almost impossible.

Udylite Tempron Cylinders withstand, even under load, the highest temperatures used in plating. Withstand stronger acids. Have greater resistance to abrasion and can be used through the entire plating cycle.

Let us tell you more of the advantages of Udylite Tempron Cylinders or show you "on the job" examples. Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Heat Treating:

Long copper-alloy rods treat without distortion.

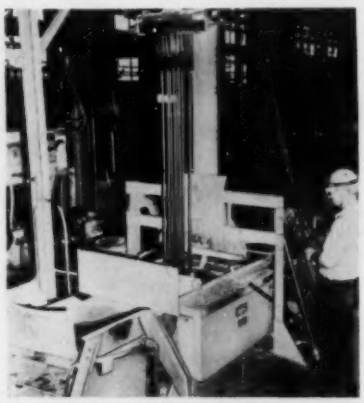
Solution heat treating of 12-ft long chromium-copper bars is now performed satisfactorily in a salt bath furnace using a time-temperature cycle of from 20 to 30 minutes at 1825°F.

Mueller Brass Company, Port Huron, Mich., manufacturers of brass and bronze forgings in almost any shape or size, had a tough time trying to do this, until recently. They wanted to heat treat the chromium-copper and beryllium-copper bars at a moderate cost, yet keep the bars free from scale and as straight as possible.

Excessive Warpage

At that time, the bars, which are up to 12 ft in length with diameters from ½ to 2 in., were being processed in a commercial heat treating shop. Available equipment necessitated heating the pieces horizontally for 1½ to 2 hours in direct gas-fired furnaces controlled at 1850°F.

After water quenching, several detrimental characteristics were evident, namely: (1) excessive warpage, (2) excessive scaling, (3) uncontrollable grain size, and (4) oxidation at the grain boundaries. Since much subsequent work was required to make the bars marketable, it was obvious that a better method of heat treating was needed. Descaling costs alone made the production uneconomical.



Operator controls immersion of 12-ft long bars into bath.

Firm Looked Around

Consequently, several different heat treating processes were investigated. Salt bath heating was one answer to scaling and excessive grain growth. It was evident, though, that too wide a temperature variation within the bath would still produce distortion and varying hardness values.

Engineers from Ajax Electric Co., Philadelphia, were consulted, and it was decided that the distortion problem could be solved only by heating the bars vertically in a bath in which uniform temperature distribution was assured. Temperatures anywhere with a bath of the proposed size were guaranteed to be within 10°F of the control setting, and with this assurance, a 115Kw electric salt

FOUND WHERE AIRCRAFT POWER AND CONTROLS TAKE SHAPE
GRAND RAPIDS GRINDERS
Bendix
BENDIX PRODUCTS DIVISION BENDIX AVIATION CORP.
FAIRCHILD ENGINE DIVISION FAIRCHILD ENGINE AND AIRPLANE CORP.
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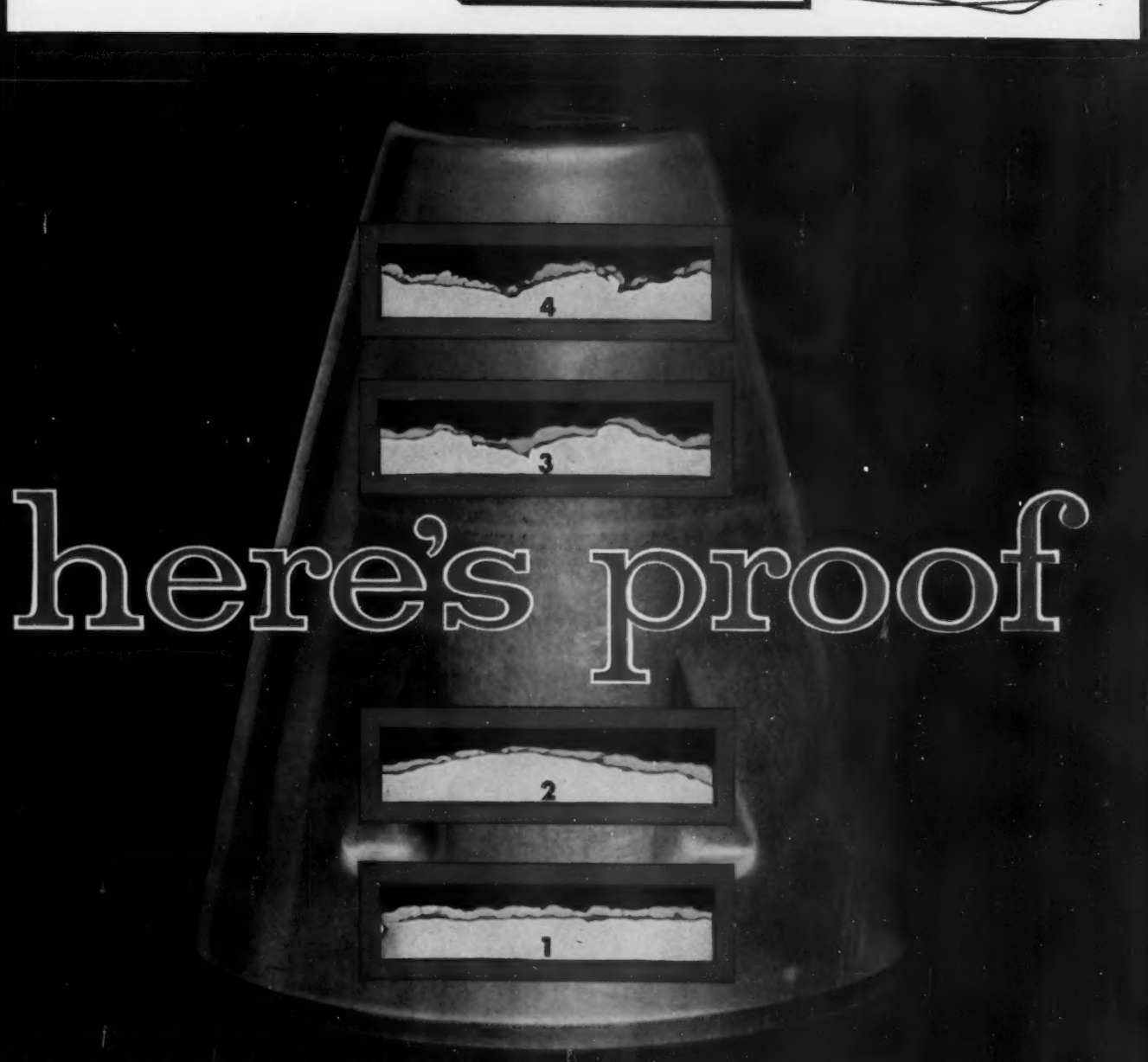
HAMILTON STANDARD DIVISION UNITED AIRCRAFT CORP.
LEAR, INCORPORATED
ORENDA ENGINES LIMITED
PRATT & WHITNEY AIRCRAFT DIVISION OF UNITED AIRCRAFT CORP.
WRIGHT AERONAUTICAL DIVISION CURTISS-WRIGHT CORP.
SUPER SABRE F-100 NORTH AMERICAN AVIATION, INC.
Precision is paramount in the manufacture of components for aircraft power and control. That's why these makers of precision parts have Grand Rapids Grinders in their toolrooms — for the utmost in precision grinding.
Model No. 55, for example, features one-piece column and base for permanent vibrationless rigidity. Longitudinal travel table and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. And it's faster than any other grinder of this type and size . . . with variable table speed up to 125 fpm.
With these built-in precision features typical of all Grand Rapids Grinders, it's no wonder they're found in leading toolrooms.
A note on your letterhead will bring full details.
GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER. Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1825 and 2500 rpm.
GALLMEYER & LIVINGSTON
GALLMEYER & LIVINGSTON COMPANY
400 Straight Ave., S.W., Grand Rapids, Michigan



here's proof

This ogive was deep drawn from a sheet of Weirzin.
Photomicrographed cross sections from ogive are magnified 1500 times.

WEIRZIN Electrolytic Zinc-Coated Steel keeps a flawless protective coating even after deepest draws

The edge view cross sections shown above prove that approximately the same thickness of ductile zinc coating remains at the extremity of the draw, 4, as at the base, 1.

That's proof that even during a deep draw Weirzin's tightly bonded coating adheres evenly to its ductile steel base without peeling or flaking, and so continues to provide complete protection against rust or corrosion.

Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail this coupon today.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin.

My product is_____

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____

STATE_____

bath furnace with working dimensions of 15 x 15 x 172 in. salt depth was purchased and installed.

Temperature exploration tests prove that the deviation from the control setting is well within the guarantee. This is possible by self-circulating action set up by the four sets of submerged electrodes.

Time Cut 75 Pct

Although yield is up 25 pct, heat treating time has actually been cut about 75 pct. Mueller reports that "more salable material is now produced because there is no longer any problem of badly sealed surfaces causing the rod to be scrapped."

Benefits from the new equipment are better than predicted. Distortion, formerly the primary problem, is now no longer appreciable; scaling is nonexistent; grain growth is controlled because of the fast heating rate of molten salt; and oxidation at the grain boundaries has been eliminated. Moreover, hardness values are more uniform, and operating and maintenance costs are lower than anticipated.

Install Thomas Flexible Couplings

First cost is only cost when you buy Thomas Flexible Couplings . . . because Thomas Flexible Couplings are correctly engineered, have no wearing parts . . . need no lubrication . . . eliminate future maintenance costs. Even more, Thomas all-metal couplings can be inspected while running—ending inspection shut-downs!

For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

NO LUBRICATION . . .
NO MAINTENANCE . . .
There Are No Wearing Parts

Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

Write for Engineering Catalog 51A

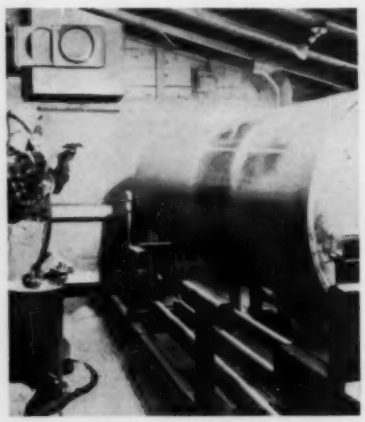
THOMAS
FLEXIBLE COUPLING CO.
WARREN, PA.

Cleaning:

Proper hose needed for shot blasting

Foundries, metal finishing plants and other activities using blast cleaning or shot peening should select hose with particular care, so say engineers of the Thermoid Co., Trenton, N. J.

When sand is used for cleaning metal and other surfaces, the number one enemy of hose is abrasion. The tube should be composed of pure gum rubber so that the sand particles will bounce off. A static wire will control static electricity.



Sand blasting can destroy improper hose in hours.

Static A Problem

When using metal shot, the greatest hose destroyer is static electricity. If not controlled electricity will generate high voltage potentials which will burn through the tube and wall. The tube must, therefore, be compounded to conduct and dissipate electricity.

When both sand blast and shot blast or shot peening are used in the same shop, the hose should, of course, not be interchanged.

- 9" column; 3' or 4' arm
- spindle speed ratio of 40-to-1
- 12 speeds (up to 3200 rpm) through direct-reading dial
- automatic tapping reverse
- adjustable spring counterbalance (feel remains the same from lightest to heaviest tools)
- hardened tang slot
- safety elevating nut and screw (arm can't drop or overrun)
- hardened arm ways for head
- rigid accurate spindle mounted on 5 precision ball bearings

You can acquire this radial for only $.28 an hour, if you operate two 40-hour shifts, by using Gilbert's new financing plan: 6% simple interest (3% add on), up to 5 years to pay (subject to change)

those who buy
GILBERT
buy Gilbert again

newest *high-speed* radial

Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare the features at the right with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast response, and wide-angle work visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

The Cincinnati Gilbert Machine Tool Co.
3344 Beekman Street, Cincinnati 23, Ohio

new amazing extension probe flashlight

usalite
DUO-FLEX
Powerful 1000 ft. beam plus flexible extension probe light for hard-to-reach dark spots. Uses 2 standard size batteries. Thousands of new industrial uses. Write for details, prices today.
2 lights in 1
No. DF-22 Pat.
U. S. ELECTRIC MFG. CORP.
222 W. 14th St., New York 11, N.Y.

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY
Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL
We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.
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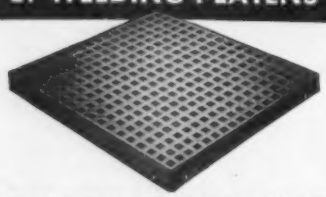
BENDING BLOCKS or WELDING PLATENS



4 ft x 4 ft—5 ft x 5 ft—5 ft x 6 ft. Also other sizes. Cast steel blocks for layout, welding & assembly. Tools, stands & accessories. Write today for information.
ACORN IRON & SUPPLY CO.
Delaware Ave. & Poplar St., Philadelphia 23, Pa.

JOINING: Adhesive Bond

Modified phenolic liquid adhesive produces shear strengths in excess of specifications . . . It has good peel strength . . . Resists heat to 180°F.

Newly modified, a phenolic liquid adhesive produces shear strengths in excess of those required by military specifications for structural bonding.

Better Filleting Properties

The liquid adhesive has good peel strength and good heat resistance up to 180°F. It maintains its high strength properties over a service temperature range of minus 65° to 180°F and is used to bond metal facings to honeycomb core material in the production of honeycomb structures and also for bonding metal-to-metal panels.

It has better filleting properties than nitrile phenolic adhesives but is less effective in this respect when compared with the most epoxy compounds. Peel strengths on bonded honeycomb structures are superior to those obtained with epoxies but lower than those obtained with nitrile phenolics.

Military Specifications Exceeded

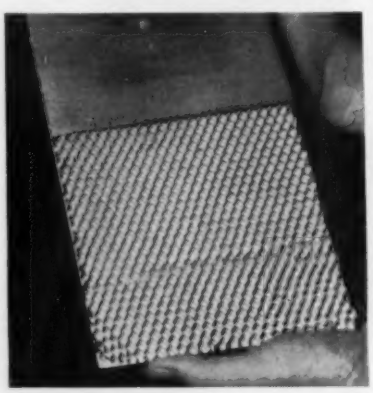
A bond with room temperature shear strengths of 5300 psi, which exceeds requirements of military specifications, is obtained by curing adhesive for 45 minutes at 350°F under a pressure of 50 to 200 psi.

Longer cures will produce high elevated temperature strength properties. For example, after curing for two hours at 350°F and under a pressure of 50 psi a typical aluminum joint bonded with adhesive has a 180°F service temperature shear strength of 4000 psi. Cures as short as 30 minutes at 325°F will produce strengths sufficient for many applications.

Application Methods

A clean, dry, grease-free bonding surface is necessary for the development of high strength bonds. Metal surfaces must be sufficiently clean to sustain a continuous water film.

For metal-to-metal bonding a 3 to 4 mil dry film thickness of adhesive is applied to each surface.



Bond has room temperature shear strengths of 5300 psi.

If the adhesive is applied in multiple coats then a 30-minute air drying period should be allowed between and after each coating. A force dry of 20 minutes at 250°F should follow each air drying procedure.

Honeycomb Sandwiching

When used as a honeycomb sandwich adhesive, an 8 to 10 mil dry film thickness of adhesive is

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

applied to both facings and core by roller, brush, spray or coating methods. The multiple coating procedure is the same as that for metal to metal bonding.

The material is the product of Minnesota Mining & Mfg. Co.

Plastics:

Polyethylene backing gives tape high strength

A new kind of transparent pressure-sensitive tape utilizes a special polyethylene-surfaced cellulosic backing.

The stronger polyethylene surfacing on the tape backing largely overcomes the tendency towards accidental breakage as with ordinary cellophane tape.

Crystal Clear Adhesive

Tape's adhesive is of a special long-aging, pressure-sensitive, crystal-clear resinous material. The top surface of the tape itself is resistant to acids and alkalis, and is impermeable to greases, oils, and powders. Contrary to regular cellophane tape, it possesses dimensional stability with flexibility at low temperatures, and has extremely long life. At the same time, it is not subject to brittleness and drying out.

The manufacturer is General Tape Corp., St. Paul, Minn.

Rolling:

Ultra-thin strip held to ±0.00005-in.

Ultra-thin metal strip held to exceptionally close tolerances is now being produced by Allied Products Div. of Hamilton Watch Co., Lancaster, Pa. Strip is furnished customers in widths to 4 in. Thicknesses are 0.010 to 0.00012 in. It is held to a thickness tolerance of ± 0.00005 in. In addition, facilities and techniques allow freedom from camber (uniform thickness across the strip's width).

Very Hard Or Very Soft

This cold-rolled, ultra-thin, precision gage strip is made in a wide

ROUND–SOLID–TOUGH

TRU-STEEL

consistently-from one lot to the next-has everything you expect and pay for in premium shot

When you pay for premium material you expect premium performance—consistently. In TRU-STEEL you get it—consistently. Precision control of manufacturing processes, unsurpassed plant facilities, and the know-how of specialists whose only business is the manufacture of steel shot,—assure it. Tru-Steel is consistently round and solid, without hollow or stringy shot that reduce life cycle. Tru-Steel has the consistent hardness and chemistry from lot to lot that eliminates monthly variation in blasting costs. And,—it's superlatively graded; no other can match its uniformity.

Tru-Steel sells and stays sold on the basis of test and comparison with any other. Write us.

NOW IN 50-POUND BAGS

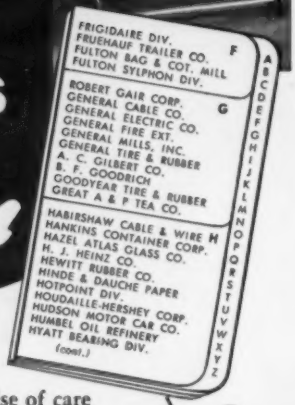
TRU-STEEL

Manufactured by
STEEL SHOT PRODUCERS, Inc.
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold and recommended by
Pangborn Corporation, Hagerstown, Md.

This prominent machine tool manufacturer has fully conveyorized assembly operations with Logan Conveyors. Here, machined castings start in foreground, and gearing sub-assemblies, electrical parts and other accessories are added as unit progresses toward rear. Part of an extensive multi-floor system.

The LEADERS use Logan



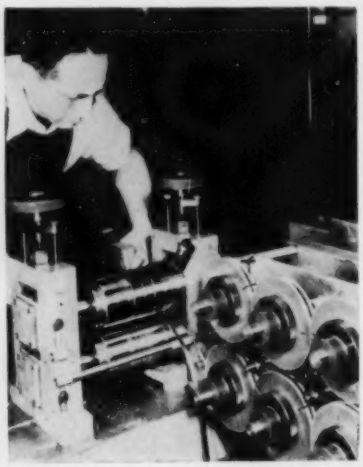
"Hitch your wagon to a star" is a philosophy which helps to make our industrial leaders. Part of this philosophy is the exercise of care in the selection of vital plant machinery such as conveying equipment. In thousands of successful establishments Logan Conveyors speed output, increase capacity in the same plant, conserve manpower, make satisfied employees. Logan can serve you, too. Write for further information or for nearest engineer to call.

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

range of metals, from very hard, high-temperature resistant alloys down to very soft light materials.

Strip is produced in a miniature integrated steel mill. This is a facility staffed and equipped to melt almost any alloy, or to produce almost any desired metal processing. The company rolls the strip from metal furnished by customers in many cases. It can melt, cast, forge and hot roll it to desired specifications. Furthermore, the division can slit strip to smaller widths with closer tolerances than are commercially available (i.e.: ribbons as narrow as 0.040 in., with widths held to ± 0.001 in.). These have clean-cut edges free of ripple.



This slitting equipment can make ribbons as narrow as 0.040-in.

Alloys:

Nickel-molybdenum-chrome nails resist acid.

Corrosion resistant alloy nails are being produced by a New York cold-headed products manufacturer. Made from a nickel base containing molybdenum and chromium, the nails withstand strong oxidizing conditions found with nitric acid, free chlorine, aqueous solutions containing chlorine or hypochlorites, and acid solutions of ferric and cupric salts. They are also highly resistant to acetic, formic and sulphurous acids.

Previous attempts to produce nails from this tough high-alloy material were unsuccessful. It has been only recently that the manufacturer, John Hassall, Inc., Westbury, N. Y., has been able to cold head this metal on a production basis.

Nails resist nitric, formic and sulphurous acids.

The alloy retains, to a large extent, the corrosion resistance of nickel-molybdenum alloys to non-oxidizing agents. It is found to be highly useful where high strength is required at high temperatures.

Metals:

Graphitic tool steel hardens above 1450°F.

Newest addition to one company's line of graphitic tool steels is a low-temperature air hardening metal. It hardens from 1450° to 1525°F, which is several hundred degrees under the temperature range normally associated with air-hardening tool steels.

Less Decarburization

Due to low hardening temperatures, the steel has been found to be less susceptible to decarburization and distortion in heat treatment. Because of its inherent graphite content, it possesses excellent machining qualities, high wear resistance and good antifrictional properties. It is dimensionally stable and highly resistant to abrasion.

The metal will be available in the full range of solids and hollow bars, say its introducers, the Timken Roller Bearing Co., Canton, Ohio.

There may be some risk in showing how Kinnear Rolling Doors solve so many *special* problems, in doorways like the one above.

It might give the impression Kinnear Doors aren't best for *ordinary* needs — which they are.

But in the picture above, note how the traveling crane moves right up to the face of the door. Notice the windows close to the door on either side. Also the steel supports and piping above the doorway. And the way floor and wall space is used clear up to the door jambs.

The Kinnear Rolling Door never gets in their way, and they never impede the door's action.

Because of Kinnear's *coiling upward action*, the whole curtain of interlocking slats coils into a small space above the opening. No usable room is wasted anywhere.

Kinnear *originated* this type of door, more than 50 years ago. It has been industry's first choice ever since.

The rugged all-steel curtain gives extra protection against weather, theft, vandalism and fire. It takes extra years of hard, daily use with minimum maintenance. Accidentally damaged slats can be individually replaced. Heavily galvanized *(1.25 oz. of pure zinc per sq. ft., ASTM standards)* it stands up longer, through toughest weather and climate. Its straight-line design harmonizes with any architectural style or building material.

Kinnear Rolling Doors are built any size, for motor or manual control. Write for full details, or recommendations to fit your needs.

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR MFG. Co.
FACTORIES:
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 113 or 114.

Arm places press controls at right spot for each job

Designed to make the work of a press operator a whole lot easier, a new press control arm provides him with a safe, efficient and flexible method of doing his job. Since the correct positioning of controls varies from job to job depending on different die setups, the press control unit has been designed to be completely mobile within the general area of its operation. The press operator can quickly reposition his operating buttons for maximum efficiency on each job. This is especially important where the press is operated single stroke to achieve economy of motion. Use of this press control thus increases strokes per minute. Properly positioned controls can lessen fatigue and increase safety as well. Simply and easily adjusted, the control provides the proper control arrangement for a tall operator as well as the short operator who may take his place on the next shift. Pedestals specially designed for use with the run button bar are also available. They feature a heavy steel base, telescoping shaft. *Clearing Machine Corp.*

For more data circle No. 25 on postcard, p. 113

High-lift truck stresses operator safety, maneuverability

A 2½-ton factory and warehouse high-lift truck has heavy duty features such as heavier counterweights, heat-treated tilting mast and a 42 hp engine. Power steering is standard equipment. New power and increased durability easily handle tough loads with reduced operating and maintenance costs. Extra wide tires, front and rear, provide traction to take full advantage of new power. Other features include: heavy duty drive axle, oversized clutch, two-speed forward and reverse transmission, extra large double-acting brakes, honed lift and tilt cylinders and more. The company particularly stresses operator safety and comfort. It has a centered cushion seat, clear floor area, two side steps, extra visibility, 10° back, 5° forward mast action with eight-inch free lift for easy control of loads. Dimensions allow maneuverability. It is 38-in. wide with a 50-in. wheelbase, has 32-in. inside and 96-in. outside turning radii. Special forks and booms are available. *Truck-Man Div., Knickerbocker Co.*

For more data circle No. 26 on postcard, p. 113

Portable shaper can be used anywhere without anchoring

Design of the supporting column and drive motor mount on a new spindle shaper is expected to be of interest to users who must shift machines to job sites or within plants. This power tool is not only very portable but can be used anywhere without anchoring. The drive system makes motor installation possible without tools or bolts, through the use of lower-cost lug-type motors up to two hp, an increase of 33 1/3 pct. The motor mount is hinged for easy, proper tensioning of the three drive belts to assure their longest possible service and maximum power output. Newly designed controls permit quicker setups on a variety of work. The new fence, standard on some models, incorporates recent improvements in shaper fence design. *Boice-Crane Co.*

For more data circle No. 27 on postcard, p. 113

Simple hand assembly of five .209" formed components into a complete housing dramatically demonstrates the precision of stampings produced on By-Products' new press line. No additional finishing or machining is necessary before final fit-up.

Formed to FIT . . . as they come off the line!

OUR VERSATILE NEW PRESS LINE CAN CUT PRODUCTION STEPS FOR YOU!

■ With a new press line for deep drawing and mass producing light gage precision parts—like the units that make up the compressor housing pictured above—*plus* extensive facilities for producing heavy plate shapes, By-Products Steel Co.'s service is now even more flexible, more useful to you!

Today, By-Products can satisfy requirements for precision formed components all the way from sheet gages up into heavier plate thicknesses. Combined with the new press line, more than 150 machines offer you the most complete plate shaping service available.

We've made the investment in equipment and manpower! You pick up the benefits . . . in lower overhead . . . fewer production steps in your shop . . . reduced freight . . . virtually no scrap loss . . . lower production costs.

Get complete details. Write, outlining your interests, to Manager, Marketing Service, 831 Lukens Building, Coatesville, Pennsylvania.

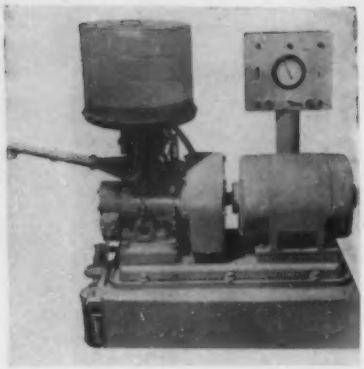
■ **PRESS LINE UNITS**

1. Automatic Loader and Greaser
2. 900 Ton Press
3. Washing Machine
4. Annealing Furnace
5. 600 Ton Press
6. Trimming Press
7. 22 Ton Punching Press
8. 45 Ton Punching Press
9. 150 Ton Punching Press

Units are linked by reversible conveyors for fast, economical production.

BY-PRODUCTS STEEL CO. LUKENS

A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



Liquefier produces liquid air at touch of a button

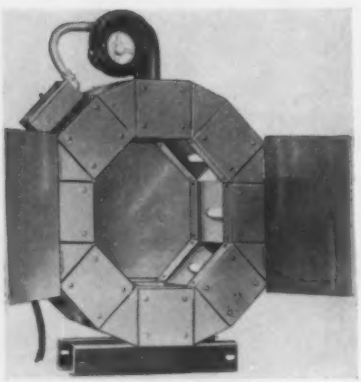
Liquid air is produced at the touch of a button in a matter of minutes with a new gas liquefier. Of simple design, the machine is only 37-in. long, 20-in. wide and 34-in. high, excluding swinging spout and concrete mounting base. In operation, helium is compressed in a chamber surrounded by a water jacket. Gas at constant volume then passes through a regenerator where it gives up more heat. Then it goes to an expansion chamber where volume increases. This lowers temperature. Without decreasing volume, helium is moved back through the regenerator to the compression chamber where cycle repeats. In returning to the compression chamber, gas absorbs heat previously stored in the regenerator. The gas liquefier produces approximately 5-qt of liquid air per hour, its maker says. *North American Philips Co., Inc.*

For more data circle No. 28 on postcard, p. 113

Restyled lathe cabinets facilitate clean-up work

Clean-up work is facilitated and shop appearance enhanced with a recently restyled line of one company's lathe cabinets. The trim, modern "new look" in the firm's ten, 11 and 12-in. swing cabinet and pedestal base lathes makes these models similar in appearance to the 14 in. swing lathe, pacesetter of the line. Two style cabinets are available in the ten, 11 and 12-in. models. In one style, a single door opens to reveal three spacious storage compartments or shelves inside the right pedestal. The second style provides three separate pull-out drawers with individual locks. Both these pedestal base cabinet styles feature a wide, deep and capacious chip pan. The rigid, compact construction of these bases saves floor space while providing a sturdy mounting for the heavily proportioned new lathes. *Logan Engineering Co.*

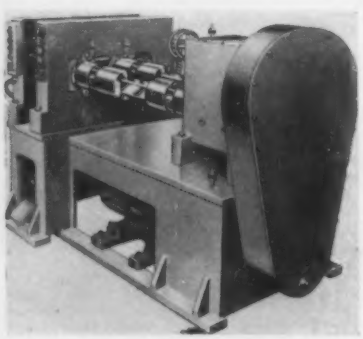
For more data circle No. 29 on postcard, p. 113



Quartz lamp gives ovens high intensity infrared energy

Laboratory ovens incorporating a new quartz lamp offer easily controlled, high intensity infrared energy. Pencil-thin quartz lamps, exceptionally resistant to thermal shock and impact, provide an intensity of 100w per inch of lamp length. This typical small quartz lamp oven is 16-in. deep with an opening of 13½-in. It holds eight 1600w quartz lamps. At maximum operation with full voltage used, the connected load for the oven is 12.8kw. It is available as a complete unit including switch, ventilation blower, lamps and two hinged doors at front. Oven's back is closed. Interior is lined with specular gold plating. This provides a reflection factor of 97-pct in directing radiant energy to the product or material being treated. Oven temperatures around 1000°F are possible. *Fostoria Pressed Steel Corp.*

For more data circle No. 30 on postcard, p. 113



Powder rolling mill has horizontal work rolls

Built and designed for progressive compacting of metal powders, this vertical rolling mill features work rolls in a horizontal plane. Metal powder is fed vertically into the rolls from a hopper located above the roll housing. A chute arrangement beneath the rolls provides for delivery of compacted strip for sintering. Mill is work-roll driven by a heavy-duty universal drive designed to transmit heavy torque loads to the precision-ground 6 x 8-in. rolls. Maximum separating force is 150,000-lb. A 15-hp four-speed drive permits rolling speeds from 5 to 30-fpm. Roll drive pinions are the continuous cut-tooth herringbone type of special alloy steel, according to the manufacturer. *Fenn Mfg. Co.*

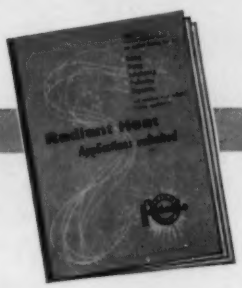
For more data circle No. 31 on postcard, p. 113

12½-minute baking cycle overhead speeds production below

Far-sighted planning by The Wright Line, Inc., prevented costly production line bottlenecks in their new one-story plant in Worcester, Mass. By suspending compact Fostoria Radiant Ovens ceiling-high . . . drying the "fine-wrinkle" finish on their metal card-handling cabinets is accomplished in 12½ minutes through controlled 365° F. radiant heat—and without interrupting the continuous flow of products at floor level!

Painted units are conveyed from spray booths upwards through 5' x 6' tunnel openings in their two 28½-foot Fostoria infrared ovens, for a fast, uniform baking-out operation. Valuable floor space is saved, production moves smoothly, and a better finish is assured at lower cost through efficient Fostoria radiant heat.

Consulting your Fostoria sales engineer can bring out some important cost-saving solutions to your finishing problems . . . heating, degreasing, baking, drying. He'll give you the facts on Fostoria radiant equipment – infrared lamp, quartz lamp or radiant rod—that will do the most work for you at lowest cost.



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INFRA-RED fostoria SYSTEM

5543

FOSTORIA PRESSED STEEL CORPORATION • Dept. 1024, Fostoria, Ohio

Pioneer manufacturer of radiant equipment—components and complete ovens

DURASPUN

20-FOOT FURNACE ROLLS
Centrifugally Cast

. . . of *Duraloy HH Alloy, one of the most widely used high chrome, medium nickel alloys.*

Two items concerning these furnace rolls may be of particular interest:

a—the size: 20 feet long—14" OD, ¾" wall thickness

b—*welding operations* by which reducing cones and shafts (both statically cast of the same alloy) were welded to the centrifugally cast rolls

These two items will serve to emphasize two phases of our service: (1) the large size centrifugally cast tubes we are able to produce and (2) our machining and finishing facilities, including welding.

Our new 16-page general Bulletin — 3354-G — gives complete details. Would you like a copy? When writing or calling would you mind telling us the general nature of your high alloy casting requirements? Better yet, if you have specific requirements on which we could help, let us have the details.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23905 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue

High vacuum furnace

This high vacuum furnace is used for laboratory research dealing with basic elements in nuclear power development. The furnace is capable of melting, sintering and vacuum annealing high tempera-

ture materials which play such an important part in the fight to overcome the thermal barrier facing industry today. Melting temperature in excess of 2000°C. can be achieved. Capacity ranges from 3 to 15 lb of steel. *New York Air Brake Co.*

For more data circle No. 32 on postcard, p. 113

Heat-treat furnace

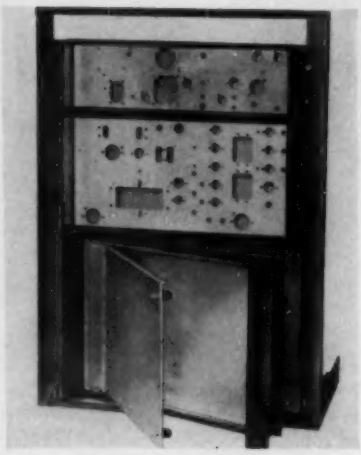
Production heat-treating of small parts is efficiently handled by a steam atmosphere tempering furnace. The furnace is equipped with

a brand new, compact panel featuring Speedomax Type H controls. The new panel is about half the width of the panels used with the company's type G instruments. *Leeds & Northrup Co.*

For more data circle No. 33 on postcard, p. 113

Swing racks

Light-weight, sturdy front-access swing racks are available in three standard sizes: 8-¾, 7 and 5-¼ in. These racks come in hinged frame with open-back chassis where dust problems are at a minimum, and in hinged frame, with hinged-front chassis where enclosure of the under-chassis parts is desirable.



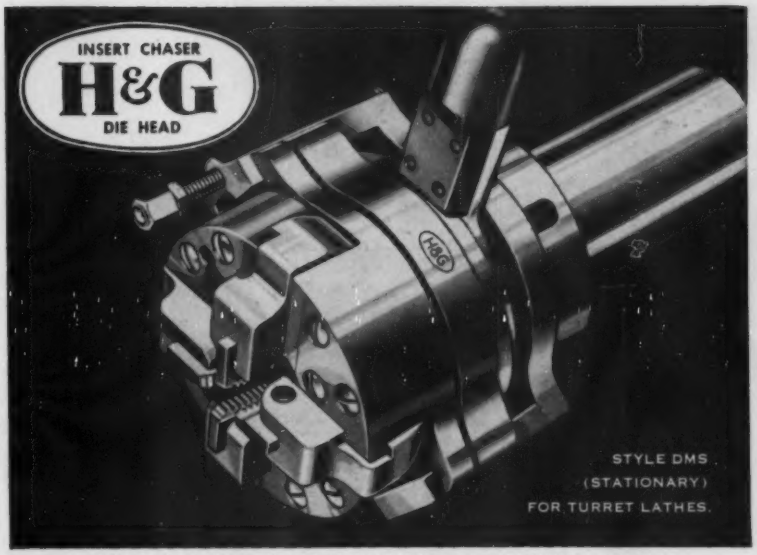
Both types of construction provide for access to under-chassis elements from the front of the panel by simply swinging the rack out. The combination of aluminum chassis and cold-rolled steel will support chassis weights up to 80 lb. 17-¾ in. minimum clearance is required for the swing racks. *The National Co.*

For more data circle No. 34 on postcard, p. 113

Heavy-duty conveyor

For conveying heavy items such as spiral metal turnings, stampings, castings, forgings, etc., this new conveyor is of unusually simple construction. No conventional chain is included in the design. Instead, precisely-built flat side skirts serve as links, insuring correct pitch, and also as sides to contain conveyed materials. Wheels are mounted on an axle rod which passes through a set of double bushings. The smaller diameter inner bushings are welded to the rear edge of leading apron pan. Larger diameter outer bushings at both sides are welded to the leading edge of following pan. *Hapman Conveyors.*

For more data circle No. 35 on postcard, p. 113



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

This die head is unique

THERE IS NO OTHER LIKE IT

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for less than $45 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve. "UNIFIED AND AMERICAN SCREW THREAD DIGEST" sent free on request.

THE EASTERN MACHINE SCREW CORPORATION 21-41 Barclay St., New Haven, Conn.

This 25-TON Hannifin Straightening Press Sells For

$4,133 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice

The ideal press for straightening heat-treated parts up to 60″ between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

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HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

This advertisement is neither an offer to sell nor a solicitation of offers to buy any of these securities. The offering is made only by the Prospectus.

NEW ISSUE

September 20, 1956

$16,377,000

Allegheny Ludlum Steel Corporation

4% Convertible Subordinated Debentures Due 1981

Dated October 1, 1956 Due October 1, 1981

Holders of the Company's outstanding Common Stock are being offered rights to subscribe at 100% for the above Debentures at the rate of $100 principal amount of Debentures for each 23 shares of Common Stock held of record on September 19, 1956. Subscription Warrants will expire at 3:30 P.M., Eastern Daylight Time, on October 3, 1956.

The several Underwriters have agreed, subject to certain conditions, to purchase any unsubscribed Debentures and, both during and following the subscription period, may offer Debentures as set forth in the Prospectus.

Copies of the Prospectus may be obtained from any of the several underwriters, including the undersigned, only in States in which such underwriters are qualified to act as dealers in securities and in which the Prospectus may legally be distributed.

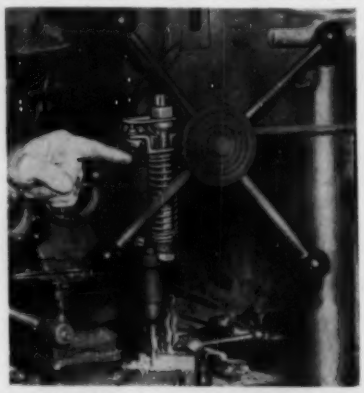
The First Boston Corporation Smith, Barney & Co.

White, Weld & Co. Eastman Dillon, Union Securities & Co. Goldman, Sachs & Co.

Hornblower & Weeks Lehman Brothers

Drill press attachment

An automatic feed device for drill presses up to ¾ in. provides automatic down feed and a new, instantly adjustable automatic depth stop and shut off. It also applies light pressure at the end of the stroke to prevent burring. Regu-



lated pressure prevents crowding and drill damage. Simple to attach, adjust and operate feed permits operator to set up the next job or do other work during drilling operation. *Diamond Tool Co.*

For more data circle No. 36 on postcard, p. 113

Save up to 75% of Galvanizing costs with Z.R.C.® . . .

Z.R.C. is applied by brush or spray, therefore, you can *galvanize* any object of any size or shape—from *ship, bridge or tower to garden equipment!*

Cost—averages 1½¢ per sq. ft.!

Z.R.C. contains 95% pure zinc, will withstand over 3000 hour salt spray test, is equally effective over new metal or wire brushed rust, comes ready mixed, has unlimited shelf life and does not require constant stirring.

Z.R.C. dries in 30 minutes to a gray matte finish—the coating is tough, flexible and firmly adherent—may be built up to any thickness.

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14 VALLEY ST. WAKEFIELD, MASS.

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STEEL CASTINGS

CARBON • ALLOY • STAINLESS

SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

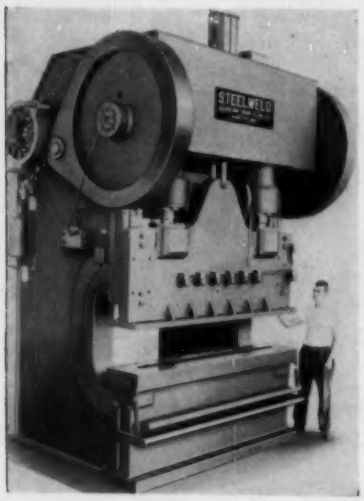
If you are interested in castings, the know-how, experience and engineering knowledge of our staff are at your service upon request.

CRUCIBLE STEEL CASTING CO.

LANSDOWNE 1, PENNA.

Brake press

Various punching requirements are accommodated with recently modified press brakes. A newly completed machine of 400 ton capacity was provided with a double plate bed which has a 3-in. wide slot to receive punching slugs. The



bed of this unit is 8-ft. 4-in. long by 17-in. wide. The press has a speed of 30 strokes per minute, but the stroke is only 2-in. The punch velocity, consequently, is very low. *Cleveland Crane & Engineering Co.*

For more data circle No. 37 on postcard, p. 113

Milling machine

Transmission housings are milled, two sides each, simultaneously, by opposed milling heads on this machine. Work is located on the large end surface through locating holes. At the first pass, two bosses are milled on two sides, the bottom bosses being close to the bottom edge of the casting on each side. For the second pass, and the milling of bearing surfaces on each side, the locating fixture turns 90°, and drops the work about one in. In this position, the cutters not only mill the bearings, but also machine the lugs' top surfaces. For this pass, heads also advance because work is narrower. All movements are automatic. Universal milling heads and changeable speeds are used. *Motch & Merryweather Machinery Co.*

For more data circle No. 38 on postcard, p. 113

A Conco engineered Crane is **top management's** idea of value. Quality like this means minimum maintenance cost, slow depreciation, tailored-to-the-job engineering, reduced accident hazards. Conco engineered Cranes reflect the more than 37 years experience that lies behind them. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.
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A FINER CRANE
CRANES HOISTS
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ARMSTRONG

SET-UP *and* **HOLD-DOWN TOOLS**

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents. Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

ARMSTRONG BROS. TOOL CO.

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★ PUNCHES ★ DIES ★ RIVET SETS ★ COMPRESSION RIVETER DIES ★

We carry your inventory.
Large stock for your convenience.
Special tools to order.
Quality and workmanship guaranteed.
Prices on Application.
Write Dept. B for New Catalog 54.

GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

Spray gun

Powdered ceramics and metals are sprayed without compressed air with a high speed spray gun. It is lightweight, has no moving parts and has a reported deposit efficiency of 95 to 99 pct. The gun incorporates an entirely new principle which permits thermal spraying of a number of materials without the

use of compressed air. The unique thermal efficiency achieved in the design of the gun permits use of comparatively high melting-point materials, such as the boron-silicon self-fluxing alloys used for hard facing and corrosion resistance; stainless steels, chrome-nickel alloys, bronze, and ceramics, such as alumina and zirconia. *Metallizing Engineering Co., Inc.*

For more data circle No. 39 on postcard, p. 113

Paint heater

Compact and rugged, a new paint heater with a recirculating system will raise the temperature of paint flowing through it to between 160 and 180° at the rate of 15 gph. An outstanding feature with the unit is a paint tract which can be easily removed for inspection, repair or replacement. It has a recirculating pump and motor attachment. When the gun is not operating, loss of heat is prevented by constant circulation of the paint through the heater, hose and gun. It is recommended when production is not constant or when the spray gun will be frequently shut off. *Binks Mfg. Co.*

For more data circle No. 40 on postcard, p. 113

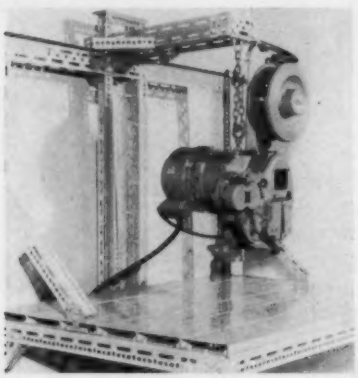
Induction furnace attains 4200°F in minutes

Ultra high temperatures (4200°F plus) can be attained in ten minutes with a newly developed tube operated generator. It is designed for high-frequency induction heating on both ferrous and nonferrous materials to any desired temperature. The 4200°F heat is reached with the use of a stabilized zirconia heating element. The element can be an open end tube or in a crucible form. Dimensions of the element vary from ¾ to 1¼ in. ID, with an effective length of three in. Temperature measurement and motorized control with a recorder-control is available as optional equipment. A graphite crucible or stabilized zirconia is used for vacuum melting at high temperatures. Atmosphere heating of non-ferrous bodies is accomplished with a unique quartz enclosed graphite cylinder. This cylinder can be used in a vertical or horizontal position. Temperatures up to 2300°F can be reached within several minutes. Numerous varied applications have been found feasible with this multi-purpose generator. *Lindberg Engineering Co.*

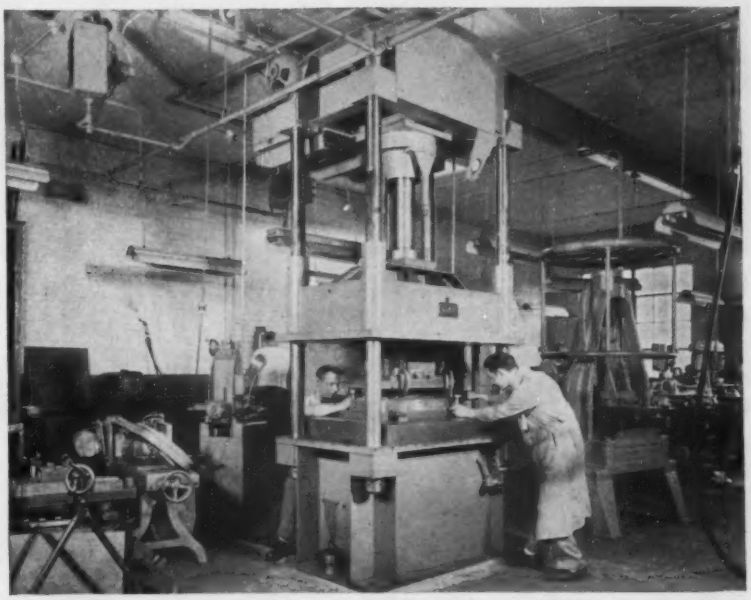
For more data circle No. 41 on postcard, p. 113

Metal stitchers

One steel firm will exhibit a number of metal stitcher models at the Metals Show. These are machines for fastening metal to metal, or metal to non-metallic materials, such as wood, rubber, asbestos, plastic, etc. In addition to the regular line of metal stitchers, the company will introduce the new semi- portable model. This machine functions the same as the floor model. It is portable to the extent that it can be mounted in almost any position, horizontally or vertically, upside down, etc. Various pieces of work to be stitched do not have to be turned to be placed on this machine as would be necessary on a conventional model. *Acme Steel Co.*



For more data circle No. 42 on postcard, p. 113



The diemaker who made a nuisance of himself

This is the story of Three Star Manufacturing Co.—a custom diemaker who serves a number of manufacturing plants in Chicago.

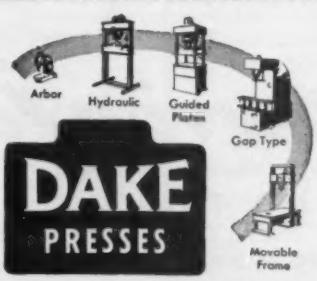
As in most such shops, his only means of trying out dies was a hand power screw press which sometimes needed six or seven men to get the needed pressure.

Large dies had to be tried out on his customers' production presses . . . which required drayage ($15 to $20 each way) and interruption of his customers' production. It meant both expense and nuisance to his customers and himself every time a die had to be tested.

Now he has ended the nuisance by installing the press shown above in his own shop. It not only saves time and money, but avoids the embarrassment of having workers in his customers' plants see and know that occasionally a die must be taken back for adjustment.

Specifications for DAKE single-acting and double-acting die tryout presses in eighteen electrically operated models are contained in Bulletin 330. Write today for your copy!

DAKE CORPORATION, 602 Seventh St., Grand Haven, Mich.



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Please send me a copy of Dake Bulletin 330

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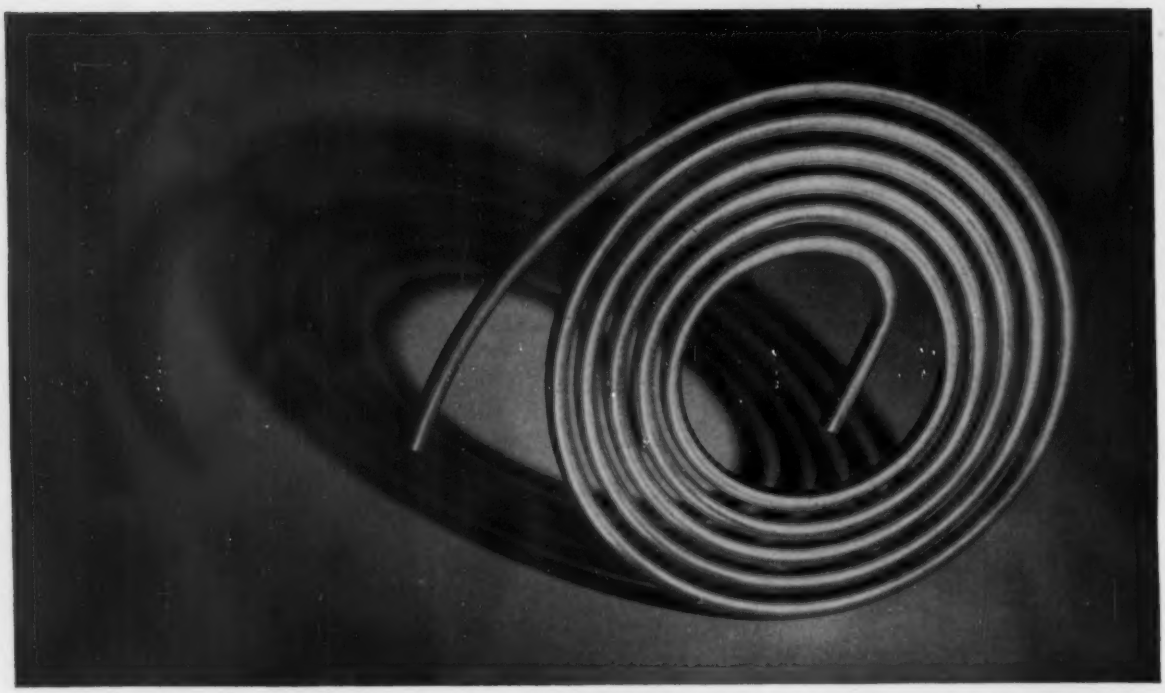


Superior offers the widest range of sizes and alloys in top quality instrument tubing

Superior Tube Company produces the finest instrument tubing in a wide range of sizes and alloys—offers you as standard products what many makers would classify as specialty tubing.

1. NEEDLE TUBING

The stainless steel links in this recording instrument are made of Superior needle tubing. The high strength, stiffness, and strict dimensional tolerances characterizing this tubing—originally designed for surgical uses—have opened new fields of industrial applications when used as mechanical tubing.

2. PRESSURE AND SUPER PRESSURE TUBING

A spiral windpipe made of Superior 304 cold-drawn seamless stainless steel tubing. Pressure tubes are used to convey fluids at elevated temperatures and pressures. Produced in stainless, carbon and alloy steels in sizes to withstand pressures up to 100,000 psi.

3. BOURDON TUBING

A "C" tube element for a pressure gage. The shaped Bourdon tube serves as the actuating element for the majority of pressure indicating and recording instruments. Helix and spiral elements are also fabricated from the wide range of alloys available at Superior—a range that makes it possible to satisfy any set of conditions in the use of Bourdon tubing.

4. CAPILLARY TUBING

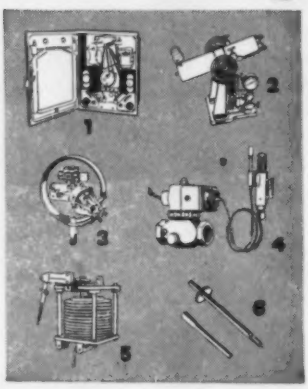
A thermostatic instrument pressure transmission element with a coiled unit made of Superior Type 321, capillary tubing. Superior capillary tubing is used primarily for transmitting temperature and pressure impulses from the source to a recording or indicating instrument. Capillary purposes, in general, require a heavy-wall tube with an ID of .006" to .030". Types 347, 321, 316, MONEL* and carbon steels are recommended analyses.

5. LARGE OD LIGHT WALL TUBING

A large OD light wall tubing bellows in a pressure actuating element. Present applications for large OD light wall tubing include bellows, low pressure heat exchanger tubes, flexible hose, aircraft ducting, fractional horsepower motor casings, ceramic drills, and casings for radioactive well logging instruments. Sizes offered up to 2½" OD.

6. MECHANICAL TUBING—INSTRUMENT LINE

Various fabricated parts—all made of Superior mechanical tubing. Superior mechanical tubing can be either seamless or WELDRAWN† grade used statically or dynamically, but not subjected to severe temperature or pressure. It is produced in sizes up to ⅝" OD within production limits, in many special shapes, and in over 63 standard analyses and mechanical properties.



Send for free copy of Bulletin 40—A Guide to the Selection and Application of Superior Tubing. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅝" OD—certain analyses in light walls up to 2½" OD

On the West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.

*Reg. T.M. International Nickel Co.
†Reg. T.M. Superior Tube Co.

The Iron Age SUMMARY . . .

Steel producers are posting "standing room only" signs for fourth quarter . . . Bars join tight market lineup . . . New orders running 10 to 20 pct ahead of mill shipments.

Getting In Line . . . Steel producers are posting "standing room only" signs for balance of this year. Consumers without firm commitments from the mills are lining up.

The market is even tighter than the fat order books show. That's because many users—particularly those in construction—have made adjustments in their schedules in line with the steel they know they can get. Any expansion of activity must be based on foreign or other premium priced steel. There will be more of this in the future.

The tightening hot-rolled bar market is approaching the critical stage. Bar mills that were looking for business a few weeks ago suddenly find their order books filling up. Ford Motor Co.'s decision to quit making bars in its steel plant the first of next year will aggravate the situation. Cold drawn bar outlook also is tough.

Big Push . . . It now looks like automotive will supply the big push to the fourth quarter market. Other strong users will include construction, freight cars, heavy plant equipment, ship builders, and road builders. Oil and gas people will take all the pipe and plate available; some already are using foreign plate and conversion plate, would take more if it were offered.

Incoming orders are running 10 to 20 pct ahead of shipments even though mills are carefully screening inquiries. Backlogs are running in excess of 17 weeks at capacity, assuring carryovers into first quarter.

The cold-rolled sheet picture is drastically different from what it was a month ago—there is no space left for those who are not solid on promises. And there is the probability that those who think they are all set will be disappointed later this year. Automotive orders have put stainless strip in this same category.

Behind Sheet Picture . . . Two main reasons for the changed sheet picture are strong demand from auto producers and the increasing drain on raw steel supply due to the continuing upsurge in the heavy product market.

The steel scrap market eased off again this week, apparently signaling a definite reversal of the trend that carried prices to all-time highs.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,511	2,498	2,437	2,341
Ingot Index				
(1947-1949=100)	156.3	155.5	151.7	145.5
Operating Rates				
Chicago	107.0	101.0*	101.0	96.5
Pittsburgh	102.0	102.0*	98.0	100.0
Philadelphia	104.0	102.0	105.0	98.0
Valley	97.0	99.0*	95.0	95.0
West	99.0	99.0	98.0	73.0
Detroit	102.0	102.0	97.0	97.0
Buffalo	105.0	105.0	107.0	105.0
Cleveland	105.0	106.0*	99.0	102.0
Birmingham	96.0	86.0	93.0	96.0
S. Ohio River	92.0	90.0*	90.0	91.5
Upper Ohio R.	107.0	106.0*	99.0	101.0
St. Louis	100.0	97.0	95.0	99.0
Northeast	100.0	100.0	100.0	95.5
Aggregate	102.0	101.5	99.0	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04	$59.09
Scrap, No. 1 hvy (gross ton)	$57.33	$58.17	$58.50	$44.83
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	35.25*	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	103.00	104.875	99.875	96.25
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Mills Wait For Automakers

There's some space, but not much, for carmakers on fourth quarter order books . . . Automotive buyers haven't committed themselves completely up to now.

◆ WHILE AWAITING full impact of automotive industry's product orders, mills are keeping an open mind about fourth quarter bookings. It appears this is all that's "open" for after the automakers come into the market heavily for metals to turn out '57 models, there will be little empty space on order books.

If the mills are playing the situation close to the vest there's every indication that carmakers are doing the same. Orders up to now haven't been as large as the mills figured. Lots of reasons are advanced for the slowness of automotive buyers to commit themselves. Overbuying last year, higher steel prices and tighter credit, fear of overloading car dealers are some of them. However, the slow start will probably be made up for later with steel product supplies frozen tight shut by December.

News of price increases this week includes word that Republic Steel has advanced heavy electrolytic tinplate from $6.975 to $7.425 per hundred pounds, at Niles, Ohio, producing point. Increase was effective Sept. 28. Product, supplied in gages of 27 to 22, is most used for automotive air filter tops, valve rocker arm covers, filter jacket inserts.

Three major tin can manufacturers — American Can Co., Continental Can Co., and National Can Co. — have boosted prices an average of 3 to 4 pct effective November 1. This is the same day increases in tinplate, recently announced by steel companies, go into effect.

National Carbon Co., Div. of Union Carbide and Carbon Corp., made effective Sept. 24, an 8 pct average increase in the price of carbon and graphite electrodes and anodes. (New prices appear on page 158 of this issue.)

SHEET AND STRIP . . . December rolling time at **Cleveland** is full on cold-rolled sheets if automakers place orders equivalent to November. Carmakers are holding off on placing December tonnage until the last minute of their 45-day lead time to see how sales go on early 1957 cars. Meanwhile mills are holding off other customers until they see how much the automakers are going to take. Some hot-rolled sheet tonnage from southern Ohio is being offered in the Cleveland area for delivery this year.

Similarly, mills at **Detroit** won't commit themselves on December bookings for sheet and strip until they see how much the carmakers want. Hot-rolled product is getting tougher. One mill in the area says it has cold-rolled, galvanized, silicone and all kinds of strip for sale in November.

A **Pittsburgh** producer says automotive buyers are taking large tonnages of sheet for October but still not all they could get. General picture is one of solid fourth quarter bookings but with no great pressure for delivery or space on mill books. Producers feel consumers are cutting inventories to the bone—a policy that may not be wise if increased automotive buying brings a late year pinch.

Purchasing Agent's Checklist

PRODUCTION: Basic brick refractories are getting popular . . . p. 51

EXPANSION: Will there be a new Fairless Works on the West Coast? . . . p. 56

MARKETING: Springmakers are having a good year . . . p. 60

WASHINGTON: Money squeeze doesn't seem to be denting industrial expansion or consumer spending . . . p. 73

Mills at **Chicago** are overbooked on sheet, in both hot- and cold-rolled categories. Cold-rolled strip quotas are in for a cut, as has already been the case with hot- and cold-rolled sheet. Strip is now guaranteed capacity production through first quarter and sheet will probably be in the same position. Some automotive buyers are reported looking for additional tonnages of cold-rolled sheet over their allotments.

BARS . . . Cold-finished bar deliveries at **Chicago** are as much as four weeks behind schedule. Main cause of the delay is lack of hot-rolled bar stock. Hot-rolled carryovers are two weeks behind and this is lengthening steadily. Mills remain on 60-day rolling cycles.

Hot top forging bars are very scarce at **Detroit.** One of the reasons is shutting down of Ford's 10- and 14-in. bar mills. They had been selling to vendors, and these customers now must look for another source of supply. There is only one other large forging bar producer in the area.

Large hot-rolled bars are as tight as plate, a **Pittsburgh** mill reports. In general the picture is similar to that on flat rolled products. Customers are still reducing inventories. Mills are solidly booked in fourth quarter.

At **Cleveland** hot-rolled bars are fast becoming a candidate for "tightest" steel item, along with plate and structurals. Mills are anticipating heavy carryovers into the first quarter and deliveries are three months late in many instances.

Pressure is terrific on **West Coast** mills for more reinforcing bars and structurals.

PLATE AND STRUCTURALS . . . **Pittsburgh** producer expects to be current on orders by first of the year but sees no easing in tight supply of plate and structurals through 1957.

Producers at **Chicago** are sold out on line pipe through 1958. Since oil company customers with bigger programs in 1957 will require more pipe the situation is critical. Even using foreign and conversion plate customers are only getting one to one-and-a-half month's supply of their original fourth quarter tonnage. Conversion to obtain wide flange beams is now spreading into standards with no letup in demand.

Large tonnage orders for structurals continue to get priority at **Cleveland** with specialty orders shunted aside.

Comparison of Prices

(Effective Oct. 2, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 2 1956	Sept. 25 1956	Sept. 4 1956	Oct. 4 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

	Oct. 2 1956	Sept. 25 1956	Sept. 4 1956	Oct. 4 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic, Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡	10¾-11¾¢	10¾-11¾¢	10.75¢	9.50¢
74 to 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$57.50*	$58.00	$58.50	$44.50
No. 1 steel, Phila. area	*57.00*	58.00	58.50	46.50
No. 1 steel, Chicago	*57.50*	58.50	58.50	43.50
No. 1 bundles, Detroit	56.50	56.50	55.50	39.00
Low phos., Youngstown	*65.50*	66.50	65.50	47.50
No. 1 mach'y cast, Pittsburgh	60.50	60.50	60.50	46.50
No. 1 mach'y cast, Philadel'a	58.00	58.00	58.00	47.50
No. 1 mach'y cast, Chicago	*58.50*	59.50	59.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$57.33*	$58.17	$58.50	$44.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$13.25
Foundry coke, prompt	$17-18	$17-18	$17-18	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Nickel, electrolytic	64.50	64.50	64.50	64.50
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Tin, Straits, New York	*103.00*†	104.875	99.875	96.25
Magnesium, ingot	36.00	36.00	35.25	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. ° Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on p. 156→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$4.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00°	.....	.....	.....
Birmingham *W9*	58.50	59.00°	63.00	.....	.....
Birmingham *U4*	58.50	59.00°	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50‡	59.00‡	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. ° Add $1.00 for 0.31-0.40 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct. phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferr osilicon: $44.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.50	38.75	41.75	41.00	63.75	48.00	58.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *I4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y. *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7,* Dunkirk, *A3* (.25¢ per lb lower on Types 301, 303 and 316); Monessen, *P1;* Syracuse, *C11* (.25¢ per lb lower on Type 301 304, and 304); Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Scrap Prices Down Again

Steelmaking grades off slightly in major markets . . . But mills are having a difficult time buying any quantity at lower levels . . . Disagreement over degree of softness.

◆ SCRAP PRICES eased off again this week. But mills are having a hard time getting what they want at the lower prices. Dealers and brokers are resisting the downturn. And the tug-of-war could swing either way in the months ahead.

The easier tone first became noticeable last week, although some trade sources doubted the authenticity of some announced prices for top steelmaking grades. Orders placed last week were being filled slowly as dealers apparently adopted a "wait and see" attitude before releasing heavier tonnages.

This week, prices in Pittsburgh, Chicago, Philadelphia, and other centers declined. While most brokers agreed that the market was softer there was strong disagreement over the degree of softness. All had evidence of activity to prove their viewpoint.

One indication of which way the wind is blowing, for the moment at least, is the slight decline in going prices for industrial grades. The latest Pittsburgh industrial list went for 50c less than the previous one. Same holds true for Detroit, where industrial lists were off an average of $2.

It could be that the trade is looking ahead to increasing tonnages of coveted industrial material as the auto companies speed up their production lines on new models, following the summer-long slowdown to allow dealers to dispose of 1956 cars.

On the other side of the coin, the approach of winter usually brings a strengthening of the market as consumers lay in heavier supplies to carry them through the cold months. A tight iron ore supply also could be a factor in strengthening prices following close of the Lakes shipping season.

As a result of declines, THE IRON AGE composite price slipped to $57.33, compared with last week's $58.17.

Pittsburgh . . . Price of No. 1 heavy melting dropped $1 here as latest industrial lists, and activity in nearby areas indicate the market is off slightly. But good scrap is still expensive. Nearby, industrial bundles went for about 50 cents under last month's record figure. A mill on the fringe of the district bought No. 1 heavy melting at $61, $1 under last month's price.

Chicago . . . The local market dropped another $1 to $2 as a major mill announced a further price drop. While scrap was not moving in heavy tonnages on the newer prices, it is expected the market will continue to dip slightly. Broker buying prices have fallen, though a considerable tonnage of scrap is moving on previous orders at strong price levels.

Philadelphia . . . Adjustment to last week's price spread on prime steelmaking grades has slowed down activity here. Yard intake is light. Moderate export activity has drained off a lot of scrap and dealers have little inventory. Possibility that three ships may be loading scrap this month would make October one of the best export months of the year.

New York . . . Price for steelmaking grades is off an average of $1 here. But nobody appears too worried. Says one dealer: "What's a buck in this market?" General feeling is that business will continue brisk for some time to come—both with domestic and foreign consumers.

Detroit . . . Industrial grades were off an average of $2 in latest bidding on automotive lists. But broker buying prices for No. 1 grades remained unchanged on the strength of an order from a local mill at current prices. Despite the latest sale, opinion persists that the market will get softer as the month progresses.

Cleveland . . . Valley price dropped $1 based on sales last week, while Cleveland price went up 50¢, resulting in an abnormal differential between the two districts. In Cleveland two mills made substantial purchases of No. 1 heavy melting at $63.50. Two other mills on fringes of the Valley district bought No. 1 heavy melting for $65 and $66 for electric furnace scrap. Tonnage on auto lists in Cleveland for October will be double that for September for the first lot sold.

Birmingham . . . The scrap market continues strong in this district on practically all grades, despite the fact that one of the larger consumers has been out of the market for some time. Much of the available heavy melting scrap is being made into electric furnace and foundry steel grades, which brings prices considerably higher than when used for open hearths.

St. Louis . . . The market continues strong and most prices remained unchanged. Receipts exceed the melt slightly, but mills are unconcerned because of the present high rate of operations and the need to prepare for seasonal declines.

Cincinnati . . . Local price dropped $2.50 on No. 1 heavy melting based on buying program for October for area mill. Second mill is still out of market. Brokers are having an easy time covering sales. Monthly prices were down $1 on top grade.

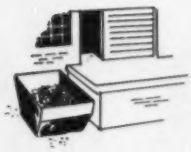
Buffalo . . . A leading mill bought small tonnages of No. 2 heavy melting and No. 2 bundles at quoted prices, counteracting a softening tendency in the market.

Boston . . . Advancing prices finally halted and turned downward, with No. 1 heavy melting dropping $1.50 to $49-$50. Lack of facilities for handling exports cut deeply into this market, and there was a corresponding drop in domestic demand.

West Coast . . . Export market is the big factor in the average increase of $3 for most steelmaking grades. Mills have good inventories.

BRINGS YOU GREATER RETURNS, CEMENTS CUSTOMER RELATIONS

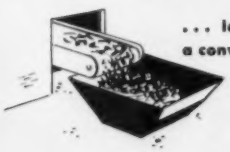
You can readily adapt the Load Lugger System to suit the needs of your individual customers . . .



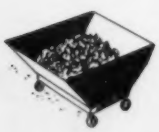
spot containers next to docks . . .

. . . on docks . . .

. . . for wheelbarrow loading . . .



. . . loading from a conveyor . . .



. . . place them on dollies . . .

or in many other ways inside or outside your customer's plant.

The LOAD LUGGER System of scrap handling

Here's how . . .

You spot individual Load Lugger containers in or near strategic work areas at a customer's plant. When full*, you pick them up with your Load Lugger equipped truck, replace them with empties—and just *one* rig services many containers. You need fewer trucks, fewer drivers. Your need for a crane and crew outside the yard is practically eliminated.

At your customer's plant each type of scrap accumulates in its individual Load Lugger container. When you pick them up your sorting has been done for you automatically, by your customer. Result? Your sorting costs are way, way down from what they were before you installed the Load Lugger system. So, you can pay higher prices for your customer's scrap. This—plus the fact that your Load Lugger service frees valuable storage space for him, gives him neater work and storage areas, reduces chances for accidents—gives you a customer-relationship that's practically competition-proof.

*In a 6 to 12 yard Load Lugger container you can handle 18,000 pound loads.

Photo courtesy Rueben R. Graff Co. Chicago

Smart scrap men are winning the "scrap" with the Load Lugger system. If you are not a Load Lugger user, it will pay you to investigate *now*—ask any scrap dealer who is a Load Lugger owner! Write or 'phone us today—no obligation.

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B-W BORG-WARNER

Scrap Prices *(Effective Oct. 2, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	38.00 to 39.00
Mixed bor. and ms. turn.	38.00 to 39.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	42.00 to 43.00
Low phos. punch'gs plate	67.00 to 68.00
Heavy turnings	54.00 to 55.00
No. 1 RR hvy. melting	67.00 to 68.00
Scrap rails, random lgth	77.00 to 78.00
Rails 2 ft and under	81.00 to 82.00
RR. steel wheels	74.00 to 75.00
RR. spring steel	74.00 to 75.00
RR. couplers and knuckles	74.00 to 75.00
No. 1 machinery cast.	60.00 to 61.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	51.00 to 52.00

Chicago

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 factory bundles	62.00 to 64.00
No. 1 dealers' bundles	57.00 to 58.00
No. 2 dealers' bundles	43.00 to 44.00
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	37.00 to 38.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. forge crops	71.00 to 72.00
Low phos. punch'gs plate	68.00 to 69.00
Low phos. 3 ft and under	66.00 to 67.00
No. 1 RR hvy. melting	64.00 to 65.00
Scrap rails, random lgth.	74.00 to 75.00
Rerolling rails	86.00 to 87.00
Rails 2 ft and under	84.00 to 85.00
Locomotive tires, cut	69.00 to 70.00
Cut bolsters & side frames	69.00 to 70.00
Angles and splice bars	74.00 to 75.00
RR. steel car axles	88.00 to 89.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machine cast.	58.00 to 59.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	47.00 to 48.00
Cast iron brake shoe	48.00 to 49.00
Cast iron wheel	58.00 to 59.00
Malleable	70.00 to 71.00
Stove plate	49.00 to 50.00
Steel car wheels	69.00 to 70.00

Philadelphia Area

No. 1 hvy. melting	$56.00 to $58.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	56.00 to 58.00
No. 2 bundles	45.00 to 47.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	46.00 to 47.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	52.00 to 53.00
RR. steel wheels	69.00 to 70.00
RR. spring steel	69.00 to 70.00
Rails 18 in. and under	76.00 to 77.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	55.00 to 56.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast.	57.00 to 59.00

Cleveland

No. 1 hvy. melting	$62.50 to $63.50
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	62.50 to 63.50
No. 2 bundles	40.00 to 41.00
No. 1 busheling	62.50 to 63.50
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	38.50 to 39.50
Shoveling turnings	38.50 to 39.50
Cast iron borings	38.50 to 39.50
Cut struct'r'l & plates, 2 ft & under	66.00 to 67.00
Drop forge flashings	62.50 to 63.50
Low phos. punch'gs, plate	63.50 to 64.50
Foundry steel, 2 ft & under	57.00 to 58.00
No. 1 RR. heavy melting	66.00 to 67.00
Rails 2 ft and under	83.00 to 84.00
Rails 18 in. and under	84.00 to 85.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	44.00 to 45.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$64.00 to $65.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	64.00 to 65.00
No. 2 bundles	45.00 to 47.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	65.00 to 66.00

Buffalo

No. 1 hvy melting	$54.00 to $55.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	54.00 to 55.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	77.00 to 78.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	70.00 to 71.00
No. 1 machinery cast.	52.00 to 53.00
No. 1 cupola cast.	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles, openhearth	56.00 to 57.00
No. 2 bundles	37.00 to 38.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	56.50 to 57.50
No. 2 bundles	41.00 to 42.00
Machine shop turn.	34.00 to 35.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	75.00 to 76.00
Rails 18 in. and under	79.00 to 80.00
Locomotive tires uncut	65.00 to 66.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	80.00 to 81.00
RR. specialties	68.00 to 69.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	44.00 to 45.00
Cast iron brake shoes	50.00 to 51.00
Stove plate	45.00 to 46.00
Cast iron car wheels	53.00 to 54.00
Rerolling rails	88.00 to 89.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	49.00 to 50.00
Elec. furnace, 3 ft & under	51.00 to 52.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and short turn	31.00 to 32.00
Shoveling turnings	33.00 to 34.00
Clean cast chem. borings	34.00 to 35.00
No. 1 machinery cast.	45.00 to 46.00
Mixed cupola cast.	41.00 to 42.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	48.00 to 49.00
Charging box cast.	48.00 to 49.00
Heavy breakable cast.	48.00 to 49.00
Unstripped motor blocks	38.00 to 39.00

Birmingham

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	30.50 to 31.50
Electric furnace bundles	53.00 to 54.00
Bar crops and plate	59.00 to 60.00
Structural and plate, 2 ft.	57.00 to 58.00
No. 1 RR. hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	69.00 to 70.00
Rails, 18 in. and under	74.00 to 75.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	77.00 to 78.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	51.00 to 52.00
Charging box cast.	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	45.00 to 46.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 3 ft & under	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	56.00 to 57.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. 18 in. & under	61.00 to 62.00
Rails, random lengths	68.00 to 69.00
Rails, 18 in. and under	76.00 to 77.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	47.00 to 48.00
Drop broken cast.	58.00 to 59.00

San Francisco

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
No. 3 bundles	29.00
Machine shop turn.	$32.00 to 35.00
Cast iron borings	30.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast.	60.00

Los Angeles

No. 1 hvy. melting	$55.00 to $57.00
No. 2 hvy. melting	52.00 to 54.00
No. 1 bundles	53.00
No. 2 bundles	40.00
No. 3 bundles	30.00
Machine shop turn.	35.00
Shoveling turnings	33.00
Cast iron borings	30.00
Elec. furn. 1 ft and under	60.00
No. 1 RR. hvy. melting	56.00
No. 1 cupola cast.	55.00

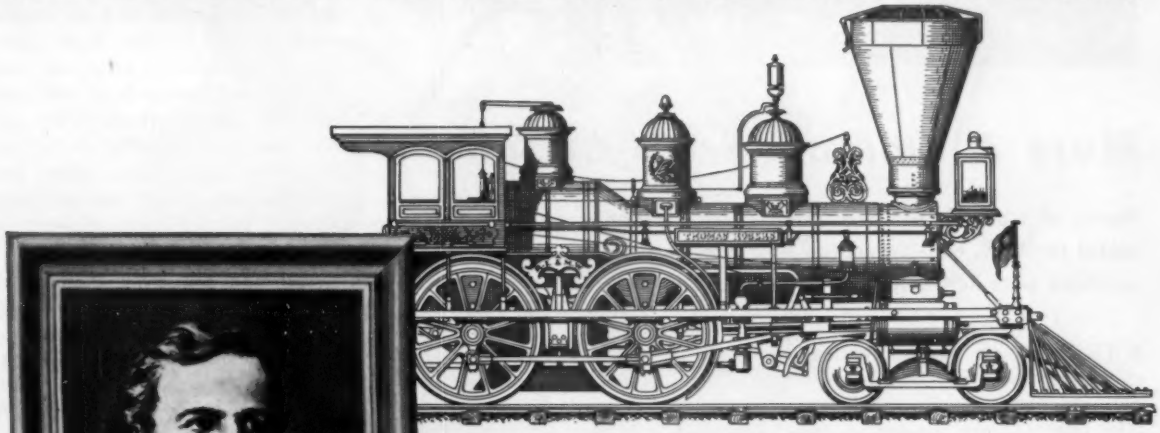
Seattle

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	$50.00 to 52.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast.	55.00
Mixed yard cast.	55.00

Hamilton, Ont.

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn.	28.00
Short steel turn.	34.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Locomotive, circa 1860, designed by A. L. Holley . . .
This is the 15th in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1869
Holley Converter

Alexander L. Holley

While ten of Alexander Holley's patents had to do with adaptations of the Bessemer process, one being the converter bearing his name, he was primarily concerned with designing locomotives. One of his earliest inventions was a steam engine cut-off, which he completed while he was still in college.

In 1860, he was asked to redesign a locomotive for the Camden and Amboy Railroad and worked with the chief engineer, Robert L. Stevens, on his project for a floating gun battery. Stevens was already well known for his famous invention of the T-Rail. This led to a close study of the metal used in armor plate and Holley went abroad to do research in England. It was this trip which first brought him into the field of steelmaking.

Today, of course, these special steels require special scrap of known analysis, a problem particularly suited to our experience, personnel, equipment, and the strategic location of our offices. Possibly our facilities may help you solve a problem in iron or steel scrap.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

More Aluminum From Canada

Plenty of water in the Saguenay District means more metal for U. S. non-integrated fabricators . . . Area has three smelters with half-million tons total capacity.

◆ THERE'S an over abundance of waterpower in Canada. For non-integrated U. S. fabricators this means more Canadian aluminum in 1956 and 1957, than in 1955.

Increase in the domestic demand is making the amount of Canadian aluminum available in this country more vital in establishing the tone of the U. S. market.

Aluminium Ltd. has already signified its intention of putting more emphasis on American sales. The big IF is water.

All of the company's Saguenay smelters depend 100 pct on hydroelectric power. At present there are five dams on the Saguenay and Peribonka Rivers that generate the required power. One of these, Shipshaw, generates more power, on the average, than Boulder Dam.

In 1954 and 1955 there just wasn't enough water. Right now all of the dams have a very high water level, with Chute-A-Caron, one of the smaller units, being forced to spill some of its water.

Tonnagewise, just how much a difference this improvement in water supply will mean is still anyone's guess. When conditions were good, in 1953, Alcan sold 124,500 tons to non-integrated users in this country. When things weren't so good, in 1954 and 1955, it dropped to average about 113,000 tons. With increased production due to expansion of facilities, in addition to more power, the amount of ingot available to non-integrated fabricators in the U. S. might well reach 130,000 tons, at least by 1957.

The Saguenay District is one of the world's largest aluminum production centers. It has three reduction plants within a short distance of one another. Arvida is the world's largest with an annual capacity of 362,000 tons. Isle Maligne boasts new king size pots reputed to be capable of substantially increased output. They are still company classified as top secret. Shawinigen Falls, among the earliest smelters on the continent is still turning out substantial tonnages.

The three plants are capable of producing over a half-million tons of metal per year. All plants are a short distance from Port Albert, from whence ingot can be shipped down the Saguenay River through the St. Lawrence to key U. S. markets.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Sept. 26	Sept. 27	Sept. 28	Sept. 29	Oct. 1	Oct. 2
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	104.00	103.375	104.00	. . .	103.25	103.00*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in September based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	103.827
Del'd Conn. Valley	40.00	Zinc, E. St. Louis	13.50
Lake copper, delivered	40.00	Lead, St. Louis	15.80

Note: Quotations are going prices.

TIN . . . The price is still fluctuating at about $1.05, 7¢ to 8¢ higher than current production and demand balance would indicate. The reason is still the uncertainty of the free passage through the Suez Canal.

It depends on who you listen to as to what the future of the Canal, and consequently the price of tin, looks like. The Institute of London Underwriters has reduced its rates for war and strike, riot and civil commotion coverage for cargoes going through the Suez Canal.

Hassan Mazhar, a former Egyptian statesman, writes in an Egyptian publication, "Indeed, everyone knows she (Egypt) has every reason to maintain the liberty of navigation in the Canal, to control it, to keep it in good order and to improve it."

On the other side of the Ocean, Economist Eliot Janeway insists that "the Suez crisis is about to inject another dose of inflation into American economy." Mr. Janeway further declares that, "It is realistic to be pessimistic about the Suez crisis."

MAGNESIUM . . . Primary ingot production and shipment of wrought products in August were both up from the previous month substantially. In August 3314 tons were produced, compared to 1136 tons in July. About 1262 tons of wrought products were shipped as compared to 1001 tons the previous month. Increase is just about what had been expected.

Actually, production was off from a year ago when 5880 tons were turned out. This reflects the strike in Dow facilities in Texas. Bright spot is the fact that despite the strike shipments outstripped the figure for a year ago, 871 tons.

Hard-Facing Gives This Valve Part A Longer Life In High-Temperature, High-Pressure Service.

Mechanization Speeds Production . . .

Cuts Cost of Hard-Facing by 40%

Valve parts hard-faced with HAYNES STELLITE alloy No. 6 have unusual resistance to oxidation, erosion, seizing and galling, corrosion, and abrasion. They will withstand wear even at elevated temperatures, and operate for long periods of time in high-temperature, high-pressure service.

Reclaiming worn valve parts or protecting new ones by hard-facing has always been an economical practice. Now mechanization has made it even more attractive. Mechanized hard-facing is fast . . . up to four times faster than manual methods. It produces smooth, sound deposits that require less finishing time. And because it provides closer control over the hard-facing operation, less rod and less oxygen and acetylene are consumed.

Haynes Stellite Company designs and produces mechanized equipment for depositing hard-facing rods by the oxy-acetylene process. Machines are available for surfacing flat, longitudinal surfaces; flat, angled or grooved parts; and for handling cylindrically shaped parts. Write to any district office for more information on mechanized equipment and on the 19 HAYNES hard-facing alloys.

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The terms "Haynes" and "Haynes Stellite" are registered trade-marks of Union Carbide and Carbon Corporation.

Nonferrous Prices *(Effective Oct. 2, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1060,1100, 3003	44.3	42.1	40.5	40.3
5052	51.8	46.8	45.1	43.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6– 8	45.5–47.3	61.3–65.1
13–14	46.2–47.7	62.3–66.3
24–26	49.4–49.5	78.1–77.3
36–38	58.3–59.9	97.4–101.0

Screw Machine Stock—2011-T-3

Size*	¼	⅝–⅞	⅞–1	1⅛–1⅜
Price	59.7	58.3	57.4	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.350–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	87.9	89.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	78.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	78.0	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.0	104.3

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AM60A, AZ92A, AZ91C (Sand Casting) 40.75 (Volume, Ton.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, Bar, HR	94	80	99
Angles, HR	94	80	99
Plate, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63	.....	.....	61.53
Brass, 70/30	52.10	52.04	.....	55.01
Brass, Low	55.85	56.30	55.75	58.06
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72	.....	50.03	55.88
Muntz Metal	53.84	47.65	49.65	.....
Comm. Bz.	59.06	59.02	59.03	61.64
Mang. Bz.	59.46	.....	53.56	.....
Phos. Bz. 5%	79.69	.....	80.08	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 27.10
Aluminum pig 25.00
Antimony, American, Laredo, Tex.. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb)..... $2.60 to $2.67
Copper, electro, Conn. Valley 40.00
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz....$90 to $100
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 35.25
ingot 36.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$255 to $257
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz..$23 to $24
Platinum, dollars per troy oz..$103 to $105
Silver, New York, cents per troy oz. 90⅞
Tin, New York 103.00*
Titanium sponge, grade A-1, $2.70 to $3.00
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative.

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 37.75
No. 120 ..... 36.50
No. 123 ..... 35.00
80-10-10 ingot
No. 305 ..... 41.00
No. 315 ..... 39.25
88-10-2 ingot
No. 210 ..... 52.75
No. 215 ..... 48.50
No. 245 ..... 43.50
Yellow ingot
No. 405 ..... 29.75
Manganese bronze
No. 421 ..... 33.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 27.25-28.00
0.60 copper max. 27.00-27.75
Piston alloys (No. 122 type)..26.75-27.75
No. 12 alum. (No. 2 grade).....25.50-26.00
108 alloy 25.50-26.00
195 alloy 27.00-28.00
13 alloy (0.60 copper max.)...27.00-28.00
AXS-679 .....25.50-26.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 26.00-26.50
Grade 2—92-95% 25.00-25.50
Grade 3—90-92% 24.00-24.50
Grade 4—85-90% 23.50-24.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	36	35¼
Yellow brass	27¼	25⅛
Red brass	31⅞	31⅛
Comm. bronze	33⅛	32⅝
Mang. bronze	25¼	24½
Yellow brass rod ends	27	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 32¾
No. 2 copper wire 31¼
Light copper 29
*Refinery brass 29¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 32¾
No. 2 copper wire 31¼
Light copper 29
No. 1 composition 30
No. 1 comp. turnings 30
Hvy. yellow brass solids 21
Brass pipe 21¾
Radiators 23½

Aluminum

Mixed old cast. ..... 17 —17½
Mixed new clips ..... 18 —18½
Mixed turnings, dry ..... 17 —17½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 29½—30
No. 2 copper wire ..... 27½—28
Light copper ..... 26 —26½
Auto radiators (unsweated).. 19 —19½
No. 1 composition ..... 25½—26
No. 1 composition turnings .. 24 —24½
Unlined red car boxes ..... 20 —21½
Cocks and faucets ..... 19 —19½
Clean heavy yellow brass ... 17 —17½
Brass pipe ..... 20½—21
New soft brass clippings .... 22 —22½
No. 1 brass rod turnings .... 19½—20½

Aluminum

Alum. pistons and struts ... 8 — 8½
Aluminum crankcases ..... 13 —13½
1100 (2S) aluminum clippings 16 —16½
Old sheet and utensils ..... 13 —13½
Borings and turnings ..... 9 — 9½
Industrial castings ..... 13 —13½
2024 (24S) clippings ..... 14½—15

Zinc

New zinc clippings ..... 7½— 8
Old zinc ..... 4½— 5
Zinc routings ..... 2¾— 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings ..... $1.85-$1.95
Clean nickel turnings ..... $1.55-$1.65
Nickel anodes ..... $1.85-$1.95
Nickel rod ends ..... $1.85-$1.95
New Monel clippings 80-90
Clean Monel turnings 70-80
Old sheet Monel 70-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead..... 12½—13
Battery plates (dry)..... 7 — 7¼
Batteries, acid free 4½

Miscellaneous

Block tin ..... 80 —81
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18½
Siphon tops 42
Small foundry type ..... 15¼—15½
Monotype ..... 14½—15
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells..... 10 —10½
Line. and stereo. dross ..... 5½— 5⅝
Electro. dross ..... 4¼— 4½

IRON AGE

STEEL PRICES

(Effective Oct. 2, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B5*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *T8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.675 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3 T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.	$74.00 *R5*		$107.00 *R5*					4.775 *G3, M3*	6.95 *M2,G3, D3,P11*	7.05 *G3*	10.10 *G3, S1,D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C3*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1 C10*					4.675 *S1, R5*	6.85 *T4*	6.95 *S1, R5*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1, J3*	$91.50 *U1, J3, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P8*	5.750 *P8* 6.85 *J9,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,P3*	6.95 *W3*	9.45 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C3*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.70 *K1*	8.05 *K1*	5.85 *K1*	5.475 *K1*	8.00 *K1*	—			
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2 C7*	8.50 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.175 *C9*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A9*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.50 *C16*	7.35 *T2*		4.675 *T2,R5* 4.975 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective Oct. 2, 1956)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bekhlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.70 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4,K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3,* M2	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *N5*	5.75 *N5*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.60 *U1, Y1*	$8.30 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.40 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3, N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.60 *J3, U1*	$8.30 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.60 *W5*	$8.30 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

(Effective Oct. 2, 1956)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Centerville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *C3*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton-Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2, W8, L2, N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.20 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C11*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, C11,J3,R3, S9,B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2, R3* 5.375 *C16*	5.075 *T2, R3* 5.375 *C16*				7.425 *T2*	4.85 *T2, R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

Steel Prices *(Effective Oct. 2, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal
P10 Precision Drawn Steel Co., Camden, N.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Dearborn Div., Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	18.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	8.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.06	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	4.50	.....	8.50	.....	10.50	.....	11.00	.....	11.50	.....	12.00	.....	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in. 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

(Effective Oct. 2, 1956)

To identify producers, see Key on preceding page

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83	D-3, D-5
Oil hardened manganese	.45	O-2
Special carbon	.41	W-1
Extra carbon	.345	W-1
Regular carbon	.29	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I7*) 20 pct
Stainless Type	304	34.60	38.00	41.50	.....
	316	39.70	43.20	46.65	.....
	321	36.35	39.80	43.50	.....
	347	39.50	43.95	48.45	.....
	405	29.20	33.15	37.05	.....
	410, 430	28.70	32.65	36.55	.....

CR Strip (*S9*) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.625	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I5*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$13.10
Old range, bessemer	11.35
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.80
Aliquippa, Pa. *J3*	167	184	...	...	184	8.10	8.65
Atlanta *A8*	169	187	...	197	193	8.20	8.80
Bartonville *K2**	169	187	...	197	193	8.20	8.80
Buffalo *W6*	...	...	...	...	...	8.10	8.50
Chicago, Ill. *N4***	167	185	167	195	191	8.10	8.70
Cleveland *A6*	173	...	...	...	...	8.10	.....
Cleveland *A5*	...	...	...	...	...	8.10	.....
Crawfordsville *M4**	169	187	...	197	193	8.20	8.80
Donora, Pa. *A5*	167	181	...	195	187	8.10	8.50
Duluth *A5*	167	181	...	195	187	8.10	8.50
Fairfield, Ala. *T2*	167	181	...	195	187	8.10	.....
Galveston *D4*	169;	...	...	...	...	...	.....
Houston *S2*	172	186	...	200	192	8.35	8.75
Johnstown, Pa. *B3**	167	185	167	...	191	8.10	8.70
Joliet, Ill. *A5*	167	181	...	195	189	8.10	.....
Kokomo, Ind. *C9*	169	183	...	197	189	8.20	8.60
Los Angeles *B2**	...	...	...	...	...	9.05	9.65
Kansas City *S2*	172	186	...	200	192	8.35	8.75
Minnequa *C6*	172	186*	172	200	192*	8.35	8.75
Monessen *P6*	167	185	...	...	191	8.10	8.10
Pittsburg, Cal. *C7*	186	204	...	...	207	9.05	9.45
Portsmouth *P7*	...	...	...	...	...	8.10	.....
Rankin, Pa. *A5*	167	181	...	...	187	8.10	8.50
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*	...	...	...	219	...	9.05	9.45
Sparrows Pt. *B3**	...	...	...	197	193	8.20	8.80
Struthers, O. *Y1*	...	...	...	...	...	8.10	8.50
Worcester *A5*	173	...	...	...	...	8.40	8.80
Williamsport, Pa. *S5*	...	...	173	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: * zinc at 12.5¢ per lb; ** 13½¢ zinc.

‡ —Wholesalers only.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Ohio City	City Delivery ‡ Charge	Sheets Hot-Rolled	Sheets Cold-Rolled (15 gage)	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As Rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As Rolled	Alloy Bars Cold-Drawn 4140 Annealed
Atlanta		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	9.54	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70-8.80	9.73-9.83	10.82-11.02	8.79-8.89	.....	8.98-9.08	8.90-9.00	8.88-8.98	10.71-10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70-7.85	8.88-9.05	9.85	7.78-7.93	.....	8.01-8.16	8.05-8.20	7.91-8.06	8.35-8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.85	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.83	9.03	9.75	8.03	.....	8.36	8.53	8.14	8.75	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.95	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00	10.75	11.75	9.20	.....	9.45	9.05	8.90	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.97	9.17	9.97	8.05	.....	8.28	8.39	8.18	8.72	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89-7.99	9.08-9.18	9.66-10.22	8.58-8.68	.....	8.28-8.38	8.38-8.48	8.37-8.47	9.12-9.22	14.80	14.15-14.25	18.20	17.90
Pittsburgh	.15	7.83	9.03	10.20	8.03**	.....	8.16	8.20	8.06	8.75	14.65	13.80-14.10	18.05	16.85-17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.85	10.40	10.90	9.05	.....	8.95	8.95	8.90	12.40	15.85	15.35	19.70	19.45
Seattle	.00	9.35	11.20	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02-8.17	9.16-9.36†	10.03-10.18	8.11-8.26	.....	8.34-8.49	8.48-8.63	8.25-8.40	8.93-9.08	14.83-14.98	14.28	18.23-18.38	17.93
St. Paul	.25	8.35	.....	10.37	8.45	.....	8.86	8.90	8.58	9.27	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*	...	...	12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.70	15.10	.....
Detroit *D2*	8.05	9.90	12.70	.....	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	...	...	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.90	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	7.95	9.80	12.60	15.00	17.95
Trenton *R4*	...	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Oct. 2, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35				
So. Chicago *R3*				8.775			
Ensley *T2*	5.075	6.00					
Fairfield *T2*		6.00		8.775		6.025	
Gary *U1*	5.075	6.00				6.025	
Ind. Harbor *I3*	5.075		6.35	8.775		6.025	
Ind. Harbor *Y1*				8.775			
Johnstown *B3*		6.00					
Joliet *U1*	5.075		6.35				
Kansas City *S2*				8.775			
Lackawanna *B3*	5.075	6.00	6.35			6.025	
Lebanon *B3*							13.10
Minnequa *C6*	5.975	6.50	6.35	8.775		6.025	13.10
Pittsburgh *P5*				8.775	12.85		
Pittsburgh *J3*				8.775			13.10
Seattle *B2*				9.275		6.175	13.16
Steelton *B3*	5.075		6.35			6.025	13.10
Struthers *Y1*				8.775			
Torrance *C7*							
Williamsport *S5*		6.15					
Youngstown *R3*				8.775			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.50 to $14.75
Foundry, beehive (f.o.b. oven)
$17.00 to $18.00
Foundry, oven coke
Buffalo, del'd $30.75
Detroit, f.o.b. 29.50
New England, del'd 30.55
Seaboard, N. J., f.o.b. 28.75
Philadelphia, f.o.b. 28.50
Swedesland, Pa., f.o.b. 28.50
Painesville, Ohio, f.o.b. 29.50
Erie, Pa., f.o.b. 29.50
Cleveland, del'd 31.55
Cincinnati, del'd 28.59
St. Paul, f.o.b. 28.50
St. Louis, f.o.b. 30.50
Birmingham, f.o.b. 27.60
Milwaukee, f.o.b. 29.50
Lone Star, f.o.b. 25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.60
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 62.93
Electrodeposited 50.28
Brass, 80-20, ball anodes, 2000 lb or more 60.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 80.50
Copper sulphate, 5 or more 100 lb bags, per cwt. 27.15
Nickel salts, single, 4-100 lb bags.. 38.25
Nickel chloride, freight allowed, 300 lb 46.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 22.35
(Philadelphia price 22.60)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 39.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	Pct Discounts 20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy. — Full Case or Keg Price

⅝ in. or smaller 63
⅞ in. to 1 in. inclusive 59½
1⅛ in. to 1½ in. inclusive 64
1⅝ in. and larger 68

C.P. Hex regular & hvy.

⅝ in. and smaller 63
⅞ in. to 1½ in. inclusive 59½
1⅝ in. and larger 58

Hot Galv. Nuts (All Types)

¾" and smaller 50

Semi-finished Hex Nuts

⅝ in. and smaller 63
⅞ in. to 1½ in. inclusive 59½
1⅝ in. and larger 58
(Add 25 pct for broken case or keg quantities)

Finished

1" and smaller 65

Rivets

Base per 100 lb
½ in. and larger $10.85
Pct Off List
7/16 in. and smaller 26½

Cap Screws

New std. hex head, packaged	Discount (Packages) Bright Treated	H. C. Heat
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts,

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	33
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham 119.0
New York 131.4
Chicago 133.4
San Francisco-L. A. 140.2
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $128.00
No. 1 Ohio 128.00
Sec. quality, Pa., Md., Ky., Mo., Ill., 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) 20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $140.00
Childs, Hays, Pa. 145.00
Chicago District 150.00
Western Utah 144.00-165.00
California 170.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 150.00-157.00
Silica cement, net ton, bulk, Latrobe 26.50
Silica cement, net ton, bulk, Chicago 24.00
Silica cement, net tons, bulk, Ensley, Ala. 25.50
Silica cement, net ton, bulk, Mt. Union 23.00
Silica cement, net ton, bulk, Utah and Calif. 35.00

Chrome Brick — *Per net ton*

Standard chemically bonded, Balt.. $98.00
Standards chemically bonded, Curtiner, Calif. 108.00
Burned, Balt. 92.00

Magnesite Brick

Standard Baltimore $121.00
Chemically bonded, Baltimore 109.00

Grain Magnesite — St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk. $69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 43.00
in sacks 49.00

Dead Burned Dolomite — *Per net ton*

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.00
Midwest 16.35
Missouri Valley 15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags 8.50¢
Canadian sponge iron, Del'd in East, carloads.... 9.5¢
Domestic sponge iron, 98+% Fe, carload lots ..... 8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe..... 27.5¢
domestic 99.5+% Fe..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.24% pure..... 22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe..86.0¢ to $1.55
Aluminum freight allowed.. 38.00¢
Brass, 10 ton lots.....37.50¢ to 50.00¢
Copper, electrolytic ..... 59.50¢
Copper, reduced ..... 59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd... $5.00
Lead .....8.90¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.35 to $3.85
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed #80 ..... $1.13
Silicon ..... 43.50¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302..... 99.0¢
Stainless steel, 316..... $1.33
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh)... $4.50
Zinc, 10 ton lots .....18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Oct. 2, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.75
8.50% max. C, 50-55% Cr, 3-6% Si. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ⅛ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	10.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	10.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.90
Ton lots packed	16.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$94.00
19 to 21%	3% max.	96.00
21 to 23%	3% max.	98.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 24.15

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	35.80	38.60	39.80
0.07% max. C	33.75	36.55	37.75
0.10% max. C	33.00	35.80	37.00
0.15% max. C	32.25	35.05	36.25
0.30% max. C	30.75	33.55	34.75
0.50% max. C	30.25	33.05	34.25
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.25	30.05	31.25

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point.

Carloads bulk	12.95
Ton lots	14.60
Briquet contract basis carloads, bulk, delivered, per lb of briquet	14.40
Ton lots, packed	16.80

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	23.95	22.65
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.

Carloads, bulk	7.55
Ton lots, packed	10.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.50	75% Si	16.40
65% Si	15.25	85% Si	18.10
	90% Si.	19.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. $1.38

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Brideville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y. freight allowed, carload, per net ton $200.00

Ferrotungsten, ⅛ x down, packed, per pound contained W, ton lots, delivered $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. .....
bags, f.o.b. Washington, Pa. Langeloth, Pa. ..... $1.33 / $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3.14%, Si 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa. Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

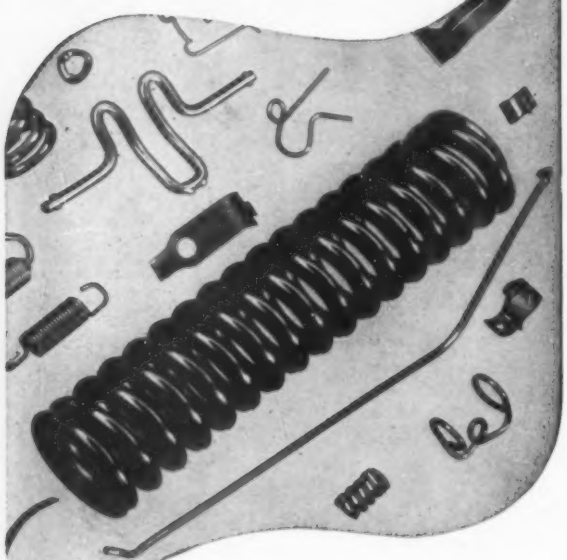
No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

COIL SPRING SAYS:



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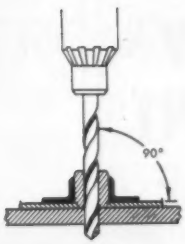
The **IRON AGE**

Free hand drilling of perpendicular holes using Anchor Bushing Drill Template at Ryan Aeronautical Co., San Diego.



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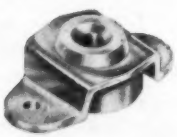

STANDARD ANCHOR BUSHING

Rejects threaten when unbushed drill templates are used to replace expensive drill jigs or fixtures on small quantity production runs.

Being low in cost and easy to make, Anchor Bushing drill templates prevent off-perpendicular drilling, inaccuracies of hole location and the use of wrong drill sizes.

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Drop Forgings

Made to your blueprints in many metals, in weights from ¼ to 15 pounds, depending on design. Accurate, smooth, and flash free. Their dense fibrous structure and controlled grain flow gives tremendous strength. Machined if desired.

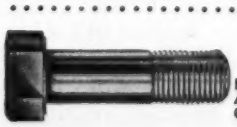
Upset Forgings

In a great variety of metals and alloys. High strength parts accurately produced —no flash, no blowholes. Excellent machining qualities.

Special Fasteners

Made to your specifications in any metal or alloy, ferrous or non-ferrous, ground or unground. Bolts to 2" diam., studs to 2½" diam. Fully dependable. Cut or precision rolled threads.

Whatever your requirements in drop forgings, upset forgings, or special fasteners, send your specifications and blueprints to RITCO for estimates.



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RHODE ISLAND TOOL COMPANY

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"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Looks Good . . . As the fall buying season gets under way the market picture for used machinery looks good. Equipment is moving well, the tight money situation doesn't seem to be having any depressing effect on buying, and dealers are on the lookout for tools to buy. Here's a general view of the over-all situation by market areas:

Philadelphia—Business is brisk with both standard and heavy duty tools moving well. Demand is strong for boring mills, planers, lathes, milling machines, and radial drills.

Pittsburgh—Bar mills are among the most wanted items, but flat rolling mills are also moving well. Sheet mills are not too active, but two-high and four-high strip mills are getting considerable attention. Shears, straighteners, levelers, and related items are active.

New York — Fabricating equipment — shears, press brakes, iron workers and similar items — are continuing in good demand. Cranes are a sought-after item, although high costs of dismantling, moving and re-erecting are a handicap.

Chicago — Drills, lathes and millers are running strongly and not easy to obtain. The press, press brake business apparently is coming not only from sheet metal fabricators, but light plate consumers as well.

Detroit — Best sellers in the area are lathes and presses. Demand for these items is strong and expected to increase.

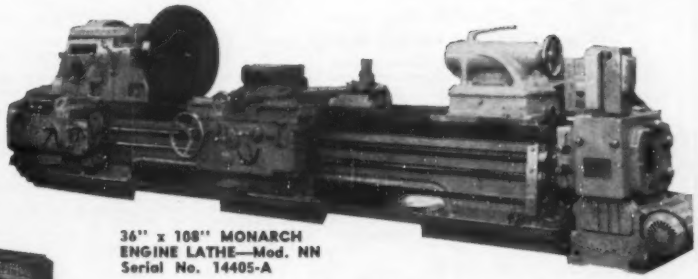
West Coast — In the Los Angeles area sheet metal equipment is wanted. Slow deliveries of new tools are shoving a lot of buyers into the market for used equipment.

At San Francisco, heavy press brakes, shears, milling machines, and turret lathes are in demand.

UNIQUE HANDLING PROBLEM was presented when flywheel and drive shaft assembly weighing 92,000 lb had to be shipped intact to South America. Unit was moved from dock to barge with 75 ton crane shown, taken down river from Granite City, Ill. to New Orleans and then into ocean-going freighter.

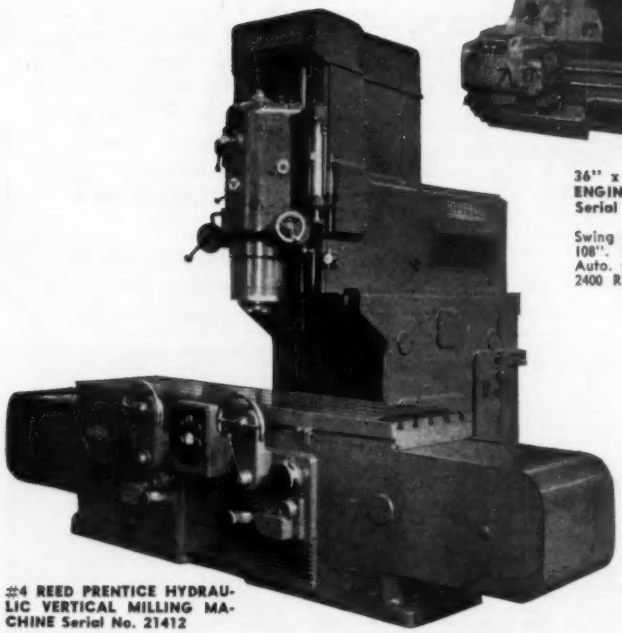
EMERMAN OFFERS FROM STOCK

FOR SALE . . . FOR RENT



36" x 108" MONARCH ENGINE LATHE—Mod. NN Serial No. 14405-A

Swing over bed 37½". Swing over compound rest 22". Dist. between centers 108". Hole thru spindle 2-3/16". Spindle speed range 2 to 405 RPM. Monarch Auto. sizing control, Coolant Pump. 36" Face plate, Centers. 40 HP 600 to 2400 RPM D.C. Drive Motor.



#4 REED PRENTICE HYDRAULIC VERTICAL MILLING MACHINE Serial No. 21412

Range: Longitudinal travel of table 48". Travel of cross slide 24". Vertical travel of head 12". Top of table to spindle nose: Max. 24", Min. 12". Table: Working surface—size overall 24"x84". National standard spindle nose #50. Speed range 20 to 1150 RPM, Feeds: Infinitely variable. Power rapid traverse, Complete electrics.

1500 TON CLEARING PRESS

Style F2-1500-106 **Serial No. 42-6289**

2 Point, Single Acting, Pneumatic Clutch and Brake. 1500 Tons, Bed Area 108", Slide Area 97"x48". Shut height to bed 48", Adjustment 8". Stroke Length 20"—Stroke per minute 20. Bed openings (2) 42½ x 69 each with cushions installed. Total Cushion tonnage 140 approx. @ 100 P.S.I. Cush. Stk. 10". Main drive motor 150 HP, 900 RPM, 2300 Volts, 3 Ph., 60 Cycle, Complete electrics, Bolster, Lub. System and Air Tanks.

36" x 72" CINCINNATI BED TYPE PLAIN HORIZONTAL HYDROTEL MILL Serial No. 41M352690-9

Table working surface 36" x 93". Range: Longitudinal 72", Vertical 48", Cross 18". Spindle speeds (16) 12 to 720 RPM. Feed rates, .6 to 15" per min. Spindle drive motor, complete electrics. Aproximate weight 50,000 lbs.

ENGINE LATHES

16" x 54" American Pacemaker, Micro Stp. Tmk. Chucks, Ser. 61770-40
20" x 96" Lodge & Shipley, T. A., Chucks, Comp. Elecs., Ser 31066, 1941
20"/31" x 20' LeBlond, Profiling Att., Comp., Elecs., Ser NF-4586, 1943
22" x 72" Lehmann, Tmk, Chucks, Comp. Elecs., Ser 5213, 1941 (2)
24" x 104" Lehmann, Tmk, Chucks, Face Pl., Comp. Elecs., Ser 5333, 1942
32" x 13'6" Niles H. D., Complete Electrics, Ser 22328, 1942
32" x 14' Pittsburgh Sommerfield, Hevi Duty, Ser 1718, 1942
32" x 25' Pittsburgh Sommerfield, Hevi Duty, Ser 1720, 1942
36" x 108" Monarch Mod. NN. Duplicating Att., Ser 14408A
36" x 14' Wickes Hevi Duty, Complete Elecs., Ser 6785-1, 1942
36" x 23' Wickes Hevi Duty, Complete Elecs., Ser 6785-3, 1942

LATHES, AUTOMATIC—PRODUCTION

No. 12 Gisholt, Tmk., F & R Slides, Comp Elecs. Ser 3012-4, 1941
No. 12 Gisholt, Hyd., F & R Slides, Air Op. Tail Stk., Ser 3017-12, 1941
No. 12 Sundstrand, 108" cc, Tmk. Brg. Center Dr. Elecs., Ser 82124, 1943
8" x 108" Lo-Swing, Tmk. F & R Slides, Tailstock, Elecs., Ser LB-4803, 1947

TURRET LATHES

No. 3 Gisholt, Tmk. Brg., Chucks, Tooling, Elecs. Ser 2839-38, 1942
No. 4 Warner & Swasey, Pre-Sel. Hd., Air Chuck, Elecs., New 1949
No. 5 Warner & Swasey, Ram Type, Pre-Selector, Chuck, Ser 550830
No. 5 Gisholt Univ. Ram Type, Tmk, Cool. Pump, Elecs., Ser 878-31, 1942
No. 2A Warner & Swasey, Pres, Ext. Bed 24", Chkg, Thr. Elecs. Ser 620134, 1942
No. 3A Warner & Swasey, Sad. Type, Bar Fd., Chuck, Elecs. Ser 524268
No. 4A Warner & Swasey, Sad. Type, Cross Sld. Turret, Ser 597780, 1942
No. 3L Gisholt, Tmk. Brg., Chucker, Tlg. Elecs. Ser 691-32, 1942
No. 7A Jones & Lamson, Bar Fd. Chuck, Comp. Elecs., Ser 60838
No. 21B Bardons & Oliver, Sad. Type, Univ. Comp. Elecs., Ser 16606, 1946
No. 22B Bardons & Oliver, Hyd. 4½" Cap. Pres. Head, Ser 17013, 1947

LATHES, AUTOMATIC—TURRET

No. 4D Potter & Johnston, Air Chuck, Air Cyl., Ser 2718, 1945 (4)
No. 5DLEX Potter & Johnston, Air Chuck, Air Cyl. Misc. Tlg. Ser 54265, 1944
No. 5D2 Potter & Johnston, 2 Spdl. Tmk. Brg., Elecs., Ser 53747, 1942
No. 6D Potter & Johnston, Tmk. Brg., Comp. Elecs., Ser 71322

EMERMAN MACHINERY CORP.

875 W. 120th St., Chicago 43, Ill. • PUllman 5-7626

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—28" REVERSING BREAKDOWN MILL, D. C. drive.
1—25" & 42" x 66" HOT STRIP MILL, 2-high reversing.
1—27" x 90" SCALE BREAKER with power screwdown.
1—28" 2-HIGH PINION STAND, modern design.
1—20" x 48" COLD MILL, 2-high, variable speed D.C. drive.
1—16" x 24" COLD MILL, 2-high; roller bearings, uncoiler, recoiler, D.C. drive, M-G set.
1—14" & 32" x 48" COLD MILL, 4-high.
1—16" x 24" COLD MILL, 2 stands, 400 HP gear set.
1—8" x 10" COLD MILL, 2-high; roller bearings, coil box, recoiler, D.C. variable speed drive.
1—5" x 8" COLD MILL, 2-high; 5 HP motor.
1—5" x 4" COLD MILL, 2-high; roller bearings, coil box, coiler, D.C. drive.
1—4" x 6" COLD MILL, 2-high; 5 HP motor.
1—24" BAR MILL, 3-high, 3 stands, with variable speed D.C. motor, traveling tilting tables, roller tables, saws, bloom shear, furnaces.
1—18" BAR MILL, 3-high.
1—12" BAR MILL, 3-high, 5 stands.
1—9" BAR MILL, 3-high, 7 stands.
1—10" ROD MILL, 14 passes.
1—34" x 192" ROLL GRINDER with motors and controls.
2—ROLLER LEVELERS, McKay, rolls 80" face x 5½" dia., with gear box and universal spindles
3—PICKLING MACHINES for sheets.
1—44" ROLL LATHE, enclosed headstock, tailstock, piano rest, 20 HP, 500/1500 RPM, 230 volts D.C. motor and controls.
2—PACK FURNACES for hot sheet mills, 62" x 60', double chamber.
1—60" MORGAN SAW, horizontal sliding frame.
1—MESTA GUILLOTINE SHEAR, 8" stroke, 28" knife, 600 tons pressure.
1—UNITED #4 BAR SHEAR, vertical open side.
1—CRACKER SHEAR, AETNA-STANDARD, capacity 2½".
1—MESTA ALLIGATOR SHEAR, capacity 3" x 3".
1—MESTA PLATE SHEAR, ½" x 126".
1—SHEET SQUARING SHEAR, Mesta, ⅜" x 156".
1—SHEET SQUARING SHEAR, ¼" x 156".
1—SLITTING SHEAR FOR SHEETS, Mesta, 96" wide.
1—12" YODER SLITTER with coil box and tension reel.
1—STRETCHER LEVELLER for sheets, 500,000 lb. capacity.
1—DRAWBENCH, MESTA, OIL-HYDRAULIC, for 3 strands of 20' bars.
1—#1 MEDART BAR STRAIGHTENER, 50 HP D.C. motor, capacity ½" to 2½" bars.
1—#4 SUTTON 2-WAY STRAIGHTENER for flats and shapes.
1—66" GALVANIZING LINE for sheets, with 2 roller levellers.
1—3500 HP GEAR DRIVE, ratio 6.45 to 1.
1—1200 HP GEAR DRIVE, ratio 4.4 to 1.
1—3500 HP MOTOR, 11000 volts, 3 phase, 60 cycle, 514 RPM.
1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
1—1000 KW MOTOR GENERATOR SET, 250 volts D.C.; 4000/3/60 A.C.
1—COKE OVEN PUSHER used very little, excellent condition.

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2220 Oliver Building, Pittsburgh 22, Pa.
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REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
1	2000	Al. Ch.	720	250	4160/2300
1	1200	Whse.	720	600	2300
1	1120	Elliott	720	260/280	2300
1	500	G.E.	1200	250	2300/440
1	500	Ch. Wa.	720	575/600	2300/440
1	300	G.E.	1200	250/275	2300
1	200	Elliott	1200	125	4000/2300
1	150	G.E.	1200	250	2300/440
1	120	Whse.	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2300

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	600	Whse.	Mill	230	110/220
2	500	Whse.	Mill	250	285/710
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	300	Whse.	Mill	230	300
4	275	Whse.	QM	230	425/850
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
1	60/80	El. Dy.	25S	230	525/1150
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
2	15	G.E.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-103	230	450/1600
1	10	Al. Ch.	E-122	220	300/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	600/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

T. B. MAC CABE COMPANY
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SELECT MACHINE TOOLS

DRILLS
5' Arm 13" Fosdick Economax hyd. radial, new 1943.

GRINDING MACHINES
72" Hanchett 3-spd. rotary surface, new 1946.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Heald hyd. pl. internal, X-sliding H. S., 1941.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-I Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
14" x 6' Hendey Toolroom, 1940.
15" 30° Lipe Carbo-Matic, 1942.
36" x 42" Bullard New Era vertical turret lathes.
126" x 96' CC Niles Bement Pond engine lathe, 80 HP, M.D.

MILLING MACHINES
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal mill, serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3B5IDIK-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. IB3P1T-1.

PLANERS
42" x 42" x 12' Liberty dbl. housing planer, 35 HP M.D.
48" x 48" x 10' Gray Maxi-Service.

PRESSES
90 ton No. 92½C Toledo D.C. Str. Side.
260 ton No. 795½-72 Toledo D.C., Toggle drawing.
500 ton No. 1039 Hamilton D.C. adj. bed, 60" x 102".
2000 ton No. 6 National Maxipress Forging Press.

SHAPERS & SLOTTERS
24" Gould & Eberhardt Universal.
32" G. & E. Invincible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.

UPSETTERS
1½" National Upsetter, guided ram, hard ways.
3½" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided rams.
7½" National Upsetter, air clutch, new 1944.

1000 Tools in Stock
Free Illustrated Catalog

MILES MACHINERY CO.
PHONE SAGINAW 2-3105
2131 E. GENESEE AVE. SAGINAW, MICH.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800/2400	1800
1	1500	G.E.	MT	6600	1187
1	1500	G.E.	MT	6600	253
1	1100	F.M.	OVZK, B.B.	4800/2400	1800
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	595
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
3	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559HY	440	3570
2	450	Whse.	CS-1429	2300/4150	354
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS8568	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL	4000/6900/13800	514
1	2850	Whse.	.8 p.f.	2300/4600	514
1	2800	Whse.	.8 p.f.	2300	720
2	2000	Whse.		2300	120
2	1750	G.E.	AT1	2300	3600
1	735	G.E.	ATI	2200/12000	600
1	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

PRESSES

#247 HAMILTON, S.S.S.C., Tie Rod, Back Geared, 125-ton, 7" stroke, G.M.D.

#650 BLISS, S.S.S.C., Hi-Speed, Tie Rod, Flywheel, 2" stroke, roll feed, scrap cutter, automatic oiling, M.D.

#30C-24 CLEVELAND, Double Crank, Gap Frame, Flywheel, 5" stroke, automatic oiling, M.D.

POWER PRESS SPECIALISTS
471 North 5th St. Phila. 23, Pa.

PRACTICALLY NEW PRESSES

Minster No. 50-7-72, cap. 200 tons, Bed 72"x50", Bliss-Toledo No. 93½H, cap. 140 tons, Bed 84" x48".
Bliss-Toledo No. 93½J, cap. 140 tons, Bed 108" x48".
Bliss No. 5-40 Double Action Toggle Draw Press, Strokes 20" and 31", will draw and lift out 15", Bed 40" x 40".

ALL MACHINES HAVE AIR CLUTCH AND SOME HAVE AIR CUSHIONS AND MOTOR DRIVEN RAM ADJUSTMENTS. STILL SET UP IN PLANT

"If it's machinery we have it."

NATIONAL MACHINERY EXCHANGE
128 Mott St. New York 13, N. Y.
CAnal 6-2470

1—30" Pinion Stand with Oil Lubrication, 2 Hi, Fast Couplings.

1—#6 Medart Bar Scalping or Peeling Machine 4" x 60" Capacity for Non-Ferrous Metals only.

1—1500 KW-GE Motor Generator Set, 6000 Amp. 514 RPM, 250 Volt DC Type MCF-12—Direct Driven. Motor 2100 HP GE Syn 514 RPM, 3/60/4000 Volt AT 1/1/14.

1—60" Mesta Plate Mill, 3 Hi—Driven by 6500 HP Electric Motor, complete with runout tables, Slab Furnaces, Pushers & Equipment.

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BENDER & STRAIGHTENER
#4 H & J, Capacity 15" I-beams, 9" Girder Rail, 100 lb. Tee Rails, Motor Drive
BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x ⅛" Webb 129-V Vertical
12' x ⅜" Southwark Pyramid Type
16' x ¼" Niles Pyramid Type
BRAKES—LEAF TYPE
10' x 16" Ga. Dreis & Krump Hand Operated
12' x ¼" Dreis & Krump
12' x ½" Dreis & Krump Motor Driven
BRAKES—PRESS TYPE
10' x ¼" Superior Hydraulic, NEW
12' x ⅜" Superior Hydraulic, NEW
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton Wright	47' Span 440/3/60 A.C.
5 ton Whiting	48' Span 220/3/60 A.C.
5 ton Shaw	56' Span 230 Volt D.C.
10 ton Cyclops	40' Span 220/440 A.C.
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	46' Span 230 Volt D.C.
25 ton L-B	60' Span 440/3/60 A.C.
25 ton L-B Incl. 300 ft. Runway	75' Span 220/3/60 A.C.
60 ton Modern	66' Span 220/3/60
80 ton Niles	72' Span 230 Volt D.C.
120 ton Niles	68' Span 440/3/60 A.C.

CRANE TROLLEY
10 Ton P&H Type HMR 440/3/60—New 1952
FORGING MACHINES
2" Ajax Air Clutch
1" to 5" Acme, Ajax, National
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.
LEVELLERS—ROLLER
44" Newbold, Nine Rolls 4" Dia.
48" Aetna Standard, 17 Rolls 3¾" Dia.
54" Aetna Standard, 17 Rolls 3¾" Dia.
72" McKay, 17 Rolls 4¼" Dia.
PRESSES—HYDRAULIC
250 ton Bliss Double Acting 42" Stroke 48x49" Bed
500 ton Elmes 18" Stroke Lower Platen 38"x66"
750 ton Baldwin Triple Acting Bolster 84" x 132"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESS—INCLINED
125 ton Beatty Open Back, 1½" Stroke, Area of Bed 28⅞ x 26⅞"
PRESS—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
100 ton Clearing, 14" Stroke, 36 x 36" Bed
250 ton Bliss, 16" Stroke, 29 x 29" Bed
250 ton Toledo, 6" Stroke, 36 x 72" Bed
PRESS—TOGGLE DRAWING
#268¼ D Toledo Double Crank Toggle Drawing 15" Stroke Bolster 108" x 60"
PUNCH & SHEAR COMBINATIONS
#44 x 48 Buffalo RAP, Capacity ½" x ⅝"
Cleveland Style G Single End, 60" Throat
No. 1½ Buffalo Universal Ironworker
ROLLS—PLATE STRAIGHTENING
72" Bertsch, Seven Rolls 7" Dia.
86" H & J. Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.
ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
20" x 60" Two High Breakdown Mill
26" x 54" United Single Stand, Two High
26" x 72" H.P. Cold Rolling Mill
44" x 28" x 44" x 144" Three High
22" x 12" x 40" Lewis 3-High Shut Mill
SHEAR ANGLE
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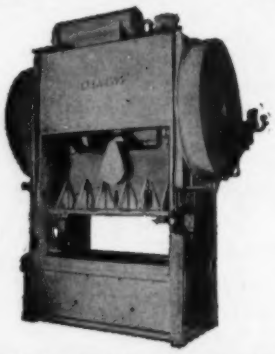

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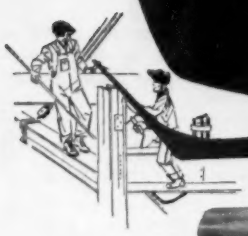

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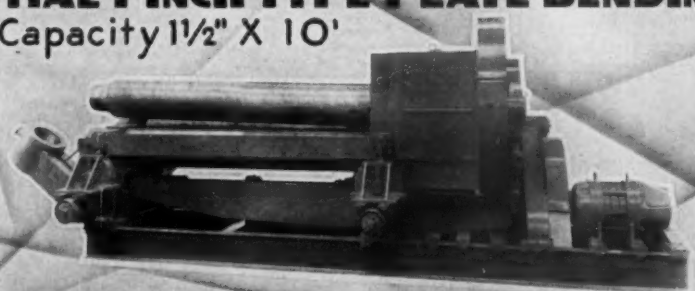

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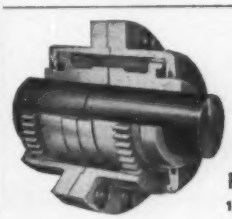

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First Steel Plant For Mississippi

Newly-incorporated Mississippi Steel Co. is planning to build a 30,000-ton capacity electric furnace plant on 30 acres at Flowood, near Jackson. Cost would be more than $1 million. Construction will get under way before year's end. Scrap for furnaces will be bought from Mississippi dealers. Group behind the mill is headed by Walter Stewart, of Birmingham, Ala.

More Steel For Mexico

The Export-Import Bank is lending a Mexican firm $26 million for expansion of steel capacity. Total cost of the program will be $35 million. The loan agreement was signed with Cia. Fundidora de Fierro y Acero de Monterrey, S. A. New equipment to be manufactured in the U. S. includes a blooming and slabbing mill; a continuous reheating furnace and cranes; two soaking pits; a flat-rolled products mill and a modern openhearth shop with 250-ton furnaces.

Steel Labor Scores Again

The United Steelworkers of America and the American Can Co., have signed a three-year contract covering 20,000 workers in 37 plants. The agreement is similar to that signed with major steel producers following a month-long strike. It provides for a wage boost of 7½¢ per hr, effective Oct. 1, and 7¢ next year and the year after. American Can agreed to supplementary unemployment benefits last year.

Ore Needs Versus Freight Cars

It all depends on how much iron ore the mills want to ship by rail after the Lake season is over. If it's heavy, Federal authorities say the shortage of hopper cars will be substantial. Hopper car supply is already short.

Kaiser Expands Refractories Capacity

With opening of its $5 million basic refractories plant at Columbiana, O., Kaiser Aluminum & Chemical Corp. is shooting for a bigger share of the market. It now sells 10 pct of the country's basic brick from a plant at Salinas, Calif., according to company officials. It hopes eventually to capture 25 pct. When additional equipment is installed, the Columbiana plant will have a capacity of 48,000 tons of basic brick.

Acme Buys Oxygen Converters

Two oxygen converters will be installed by Acme Steel Co. at its planned $15 million steel plant near Chicago. Combined capacity of the converters will be about 250,000 tons a year. Acme says considerably lower initial and operating costs, plus flexibility on short runs was why it chose the oxygen type.

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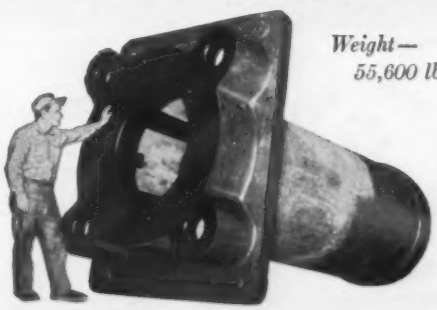

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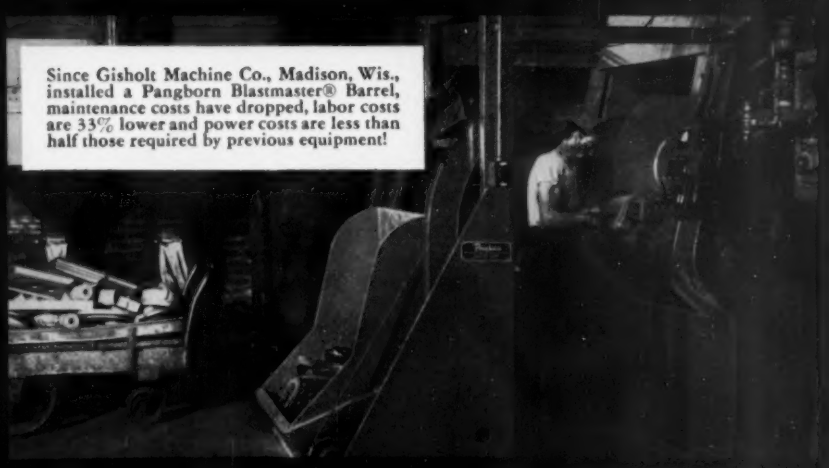

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